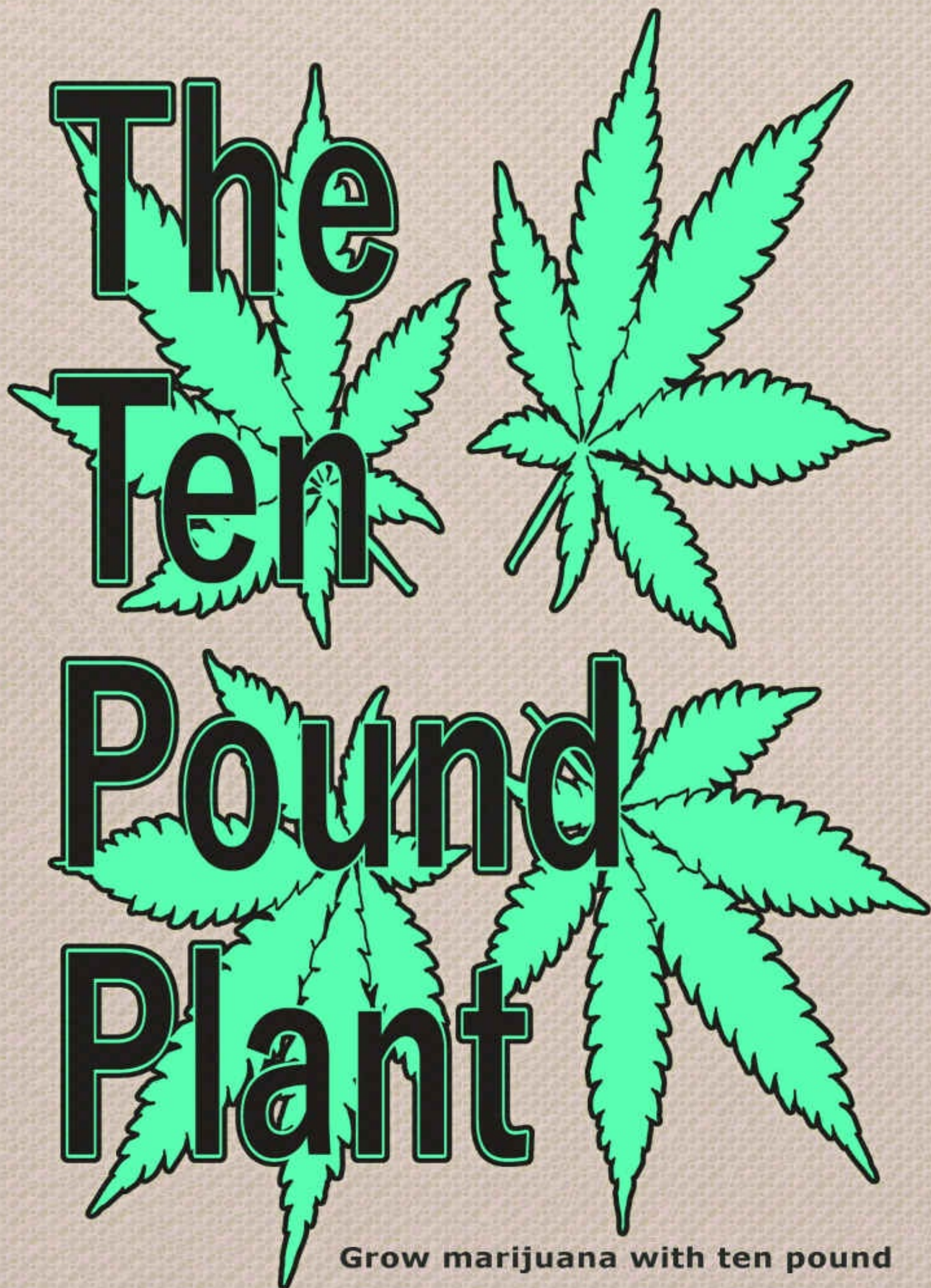




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# The 10 Pound Plant

# The 10 Pound Plant

Grow an outdoor marijuana garden with 10 pound plants

Peter Oscar Tolstoy

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This book is dedicated to my family

# Acknowledgments

This book is written with an appreciation for everyone I have learned from in the past few years. I have had many great teachers and I could never have come up with this plan without them.

My family's support has made writing this book possible. They were the ones that provided me with the time to write. They were the ones that told me to keep going when things seem to be at their worst.

Grateful thanks to my community for allowing all of us marijuana growers to grow in peace and with acceptance.

“Make the most you can of the Indian hemp seed and sow it everywhere”

-George Washington

“Hemp is of first necessity to the wealth of the country”

-Thomas Jefferson

“I now have absolute proof that smoking even one marijuana cigarette is equal in brain damage to being on Bikini Island during an H-bomb blast”

-Ronald Reagan



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# Introduction

This is a plan for outdoor growing 14 foot tall marijuana plants yielding 10 pounds of dried and trimmed buds. This is a huge improvement over most average marijuana growers' 4-5 foot tall plants with 3 pound yields. This book is a valuable resource to anyone seeking to grow marijuana or to improve their growing skills. Whereas the current marijuana growing literature is limited to low weight per plant indoor grow plans and environmentally unsound, low yield gorilla grows. This text is unique as there are no other books that permit any reader that adheres to these steps to grow the largest plants biologically and/or legally possible and produce harvests comparable in size and quality with those of elite marijuana growers.

## Mission

The purpose of this book is to provide a comprehensive blueprint for a top tier yielding outdoor marijuana grow. Hands down this book is a recipe for huge yields. This is not a textbook. In this text there is scarce extraneous information on the biology or chemistry of growing marijuana. This book does not lecture about the process of photosynthesis; it guides you with the steps to grow, harvest, process, and store pounds and pounds of marijuana.

I'm writing this book with the intention of sharing a resource. Agricultural ventures like growing marijuana is and has always been a powerful tool for individuals to obtain independence. This plan for effectively growing marijuana is a means to liberate others from wage slavery, corporate pharmaceuticals, and big alcohol business. Marijuana allows one to utilize soil, sun, and water to provide ourselves and others (law permitting) with organic, natural medicine, and a safe recreational drug.

Marijuana growing builds communities. At the moment cultivating cannabis, propagating pot, growing ganja, or developing dank herb is a community centered and individual driven industry. Every bud of marijuana that goes up in smoke is an artisanal or wild crafted product. Growing and harvesting these flowers is the fruit of a community of marijuana laborers.

Almost every other agricultural product's market is dominated by the results of operations functioning on scales thousands of times larger than the average marijuana patch. However, the marijuana industry could be on the precipice of following suit with other agricultural industries. In this current climate these instructions herein are a boon to marijuana farmers and would be gardeners. Major marijuana operations could be on the horizon. With each bit of marijuana legalization legislation larger and larger bank rolls finance marijuana grows. Soon it could be too late for anyone with less than \$1,000,000 USD to start a successful marijuana agriculture operation. These large scale marijuana farms will cut costs via the volume they work with. This cost cutting can push small scale

productions out of the market.

The only way to be competitive with the coming tide of large scale marijuana is for us to grow smart. In the past the best growing methods, like those of this book, have been clandestine information. Very few people have access material on how to grow plants that produce 10 pounds of smokeable herb. Most people, including those with large monetary efforts, fall short of harvests yielding even half this much. Therefore with this plan small independent outfits can out produce large investors with the power of information.

The power of information backing your marijuana grow, as with any endeavor, creates direction to best administer our efforts. Directionless, tireless work in a pot garden can yield pathetic and sick plants with low 1-2 pound yields. A pointed and well planned marijuana grow can make all the difference for heavy, tasty, and potent harvests. The methods of this plan could take a grower 15 years of experience to establish through years of trial and error. In the first year of enacting it, this plan will allow any marijuana grower to be competitive with the coming commercial enterprises. This book has an urgent importance to any individual that is interested in having a successful and competitive marijuana grow.

It's my mission to proliferate this plan to allow individuals and communities to grow the best pot most efficiently. I want to see pot growing communities beating the commercial outfits' profit margins. And this book empowers them to do so. Marijuana growing is a venture for the people to work for themselves, outdoors.

# Chapter One: Plan Overview

## Plan Requirements

There are certain parameters to realize the full potential of the plan. This text will present the most ideal situations and procedures. However, growers are encouraged to follow this plan as closely as you are capable and adapt where necessary.

The most tested and best resulting marijuana grow sites have been in in climate zone 9 of the US, south of the 44<sup>th</sup>, and north of the 37<sup>th</sup> parallel. If your pot patch is not in this region be encouraged to know marijuana has been found to grow wild on every continent with the exception of Antarctica.

Troubleshooting issues with geography and climate can usually be solved with simple, tried, and true agricultural practices. For example, some build greenhouses if the summer's average lows are below 35°F, or some fill reservoirs with water from an outside source if the grow site is in an exceptionally dry location.

For outdoor growing space every plant you intend to grow requires 400 square feet, a 20x20 foot square, of level land in full sun. Each plant also requires a 5x5 foot insulated indoor space and a 2x5 foot greenhouse space. The indoor space is for growing your clones in the winter and drying your harvest in the fall. The greenhouse space protects your plants from frost in the spring when you move your clones out from indoors.

Electricity and water is a must. Growers are advised to check with an electrician to find out if their grow operation location has a transformer/electric infrastructure to support the 220v 1000 watt lights used in this plan. Verify your water source can provide you with at least 150 gallons per plant a week in the height of the summer.

Budget for this plan with this simple formula. For all of you expenses allocate \$2,500 USD per plant. This budget plan covers your electric bill, your liquid nutrients, your sprays, your soil, your pots, your trellising, your T-posts, and your equipment. Growing more plants cuts overall costs per plant. Grow at least 12 plants for the best return on a first year grow and limited resources. Be aware that your costs won't come evenly throughout your growing season. Some big purchases happen all at once such as your lights and soil.

## Format

The instructions in this book are divided into 4 stages from cloned starts to October harvest. The text's examples are presented with as a 24 plant garden in mind. With each stage of growth I will walk the reader through the steps for preparing their grow operation.

Then I will examine what the day to day work and processes will look like. This book should be read start to finish before you begin and then used as a reference during your grow.

## Grow at a Glance

The marijuana grower's goal is to propagate the best dried smokeable marijuana buds as bountiful and efficiently as possible. Marijuana buds are the plant's female flowers. The flowers are valued for their THC and CBD content (a substance that the plant creates on the flower). Most partakers smoke the dried flowers or an extract from known as hash. Some eat a processed form of the THC and CBD. Pot can be consumed for medicinal uses or for recreational purposes.

Outdoor grow operations are scheduled according to marijuana's annual 2 growth stages. In the first stage the plant grows vegetative tissues with 12+ hours of light a day. Vegetative tissues are all parts of a plant that are not concerned with sexual reproduction. This includes stems, roots, leaves, and vegetative buds. The second stage in a plant's life is bloom. During bloom marijuana plants are triggered to grow flowers by experiencing less than 12 hours of light a day. The plants have adapted to the seasonal light cycles to know to grow vegetative tissue in the spring and early summer and to grow reproductive tissue in the late summer and early fall.

We start the plants indoors in the winter in order to give the plants a longer amount of time to grow vegetatively. Plants are started in late spring if there is no indoor option. Indoor growing creates a controlled growing environment where the plants can thrive whereas they would die outside. In the winter the days are shorter than 12 hours, but we can simulate the sunlight hours of spring with artificial lighting. The extra growing time indoors makes for bigger plants and a bigger harvest.

After the indoor grow stage we move the plants into a greenhouse with supplemental lighting in May. On the week of the summer solstice, usually June 21<sup>st</sup>, the plants are moved out of the greenhouse and into outdoor pots. The days begin to shorten as the sun progresses through the year after June 21<sup>st</sup>. During the first week in August the plant experiences days approaching less than 12 hours of light and it's prompted to transition to the second stage of growth, flowering (bloom). Through August and September the flowers grow and ripen. In October we harvest and dry the flowers when they are ripe and the plant begins to die.

## Plan Outline

February: make clones and/or grow seedlings and prepare grow room

March: Transplant and grow indoors

April: Grow and cultivate indoors

May: Move plants out to green house by May 14

June: Move plants out of greenhouse and into outdoor pots by June 21<sup>st</sup>

July: Grow and cultivate outdoors

August: Grow and cultivate outdoors, begin flowering transition around August 8th

September: Flowering outdoors

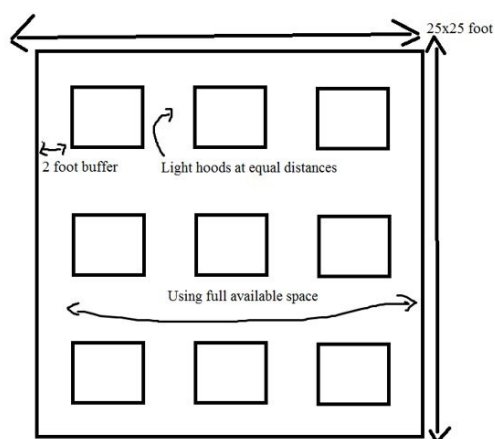
October: Flower ripens and harvest

# Chapter Two: Prepping a Grow Room

First, prepare a grow room before you obtain your clones or seeds. Finish prepping your room by the end of February. Your room should have about 25 square feet for each plant you want to grow out. If you had 24 plants you should have a room with ~600 square feet. Your grow room needs a ceiling height of at least 8 feet.

Your room's lights are the first step. There are a lot options and possibilities with lights out there, but here I will present you with one favored route. The ideal lighting conditions require 220v wiring in your room. I can't safely instruct reader how to install a 220 volt system. Therefore I just suggest you hire an electrician to wire your room with 220 volts and a number outlets that equals half the amount of plants you plan to have. These outlets can be wired in a light box, such as a MLC/CAP light controller.

In this example I will assume you are growing 24 plants in a 600 square foot room. You will need twelve 1000 watt ballasts, twelve light hoods, twelve 1000 watt MH (Metal Halide) light bulbs, and twelve 220v cords. You will hang your twelve light hoods from eyhooks in the ceiling's joists with light hanger yo-yo's. The lights are evenly spaced from one another and use all available space with a 2 foot wide buffer from the wall.



Screw a 1000 watt MH bulb in each hood. Plug each hood into a 1000 watt 220v ballast. The ballasts can be screwed into a joist or stud and then plugged into the MLC/CAP light controller. Hanging cords are a work hazard. Keep your room safe and duct tape loose cords tight against the walls and ceiling.

Your MLC has a 110v trigger plug. Connect your trigger into a timer plug. The timer plugs into a 110v outlet and sets which hours of the day your lights are on. Program your timer to with a 6 hour solid block of darkness during the hottest part of the day (~11am-5pm).

Your room will need to be light tight and light reflective. Light tight means you have no light sources to your room when the door is closed and your lights are off. Light gaps can occur as windows, doors cracks, faulty siding, and a variety of other construction issues. Spot seal your room's light gaps by covering them with panda plastic. Panda plastic is installed with the white side facing out. Light gaps are detrimental to the plants because the smallest bit of continued light exposure can stress plants or cause them to begin flowering.

After your light gaps are contained you will make your room light reflective by covering the walls and ceiling of your room with panda plastic. The plastic can be adhered to your room's surfaces with a staple gun. Use a marker pen to mark your 110v outlets as you place plastic over these units. When your plastic is secured flip the breaker

for these outlets to the off position. Then cut the plastic away from around your outlets with a box cutter. Check that you didn't damage any wiring. If not, flip your breaker back on.

Now that your lights are arranged your room needs fans. Install one 6 inch intake fan and one six inch exhaust fan for every 600 square feet to manage the intake and exhaust air in the room. One fan model can act as both exhaust and intake depending on which way it faces. The Active Air 6 is the preferred fan. These fans act on three levels for your room's environment. They cycle new cool air into a room. The lights can raise the temperature over 100°F without such a cooling system. The fans also lower humidity and move the air around the plants. Moving the air on plants creates mechanically induced stress and this helps grow hardier plants.

In the 24 plant example you can purchase two of these fans and face one in the room for intake and face one out for exhaust. The fans are installed directly into the wall. When you choose where to install your fans, space them as far apart as possible. Two diagonal corners of the room are the ideal positions. The fans need a 6 inch hole cut through your panda plastic, drywall, insulation, and through your building's siding to the outside of your building. If your walls are not exposed directly outside or you have exceptionally thick walls you can use 6 inch cylindrical ducting to connect your fan to outside the building.

The fans' 6 inch holes can be cut with a 6 inch saw drill bit. The bit cuts in between the studs in your wall and you should consult an electrician to avoid drilling through wires. Set a 6 inch wide and 2-3 foot long cylindrical ducting protruding to the outside of your building. Build a shelf underneath your 6 inch hole such that your fan will sit on the shelf and positioned into your 6 inch ducting. Put the end or front of the fan in your ducting and attach it with a 6 inch duct clamp.

Use a plug in thermostat sensor for each fan that will allow you to plug your fan into it. The sensor will allow you to program your plug to turn on the fans when the temperature in your room goes over 85°F and turn them off when the temperature drops below 85°F. In addition to your sensor you will need a thermometer/temperature gauge for your room so you can observe the temperature in the room and confirm it stays between 75-85°F.

Following your exhaust/intake fan setup you will need one wall mounted oscillating fan for every 200 square feet of grow room. The wall mounted fans also work to move the air around the room. These fans should be installed at 5 feet high and as far away from one another as possible. They can be left on a medium setting and constantly oscillating. Use 1 oscillating fan on a stand for every 400 square foot of grow room. Set them to medium and oscillating as well.

Your room requires a 70 pint or greater dehumidifier for every 600 square feet of grow room to help regulate your room's humidity. The dehumidifier is a key component to your room as marijuana reacts negatively to high humidity. Every time you water



indoors part of that water evaporates and aerosols into the air and this is expressed as humidity percentage. The hotter your room is the more water the air can hold. The dehumidifier cycles air, extracts water from the air, and deposits the water into a runoff system. Your dehumidifier model should have options to adjust and maintain the humidity in your room at 50%.

The dehumidifier's runoff system is a garden hose connected at the spout of the dehumidifier. Cut a  $\frac{3}{4}$  inch hole in the wall, remembering to be aware of live electric wire locations, with a  $\frac{3}{4}$  inch drill bit. Run the garden hose through the wall and downhill from the dehumidifier. Ensure the runoff doesn't collect at your building's foundation. If you can't lead your garden hose to a lower elevation set your dehumidifier on a cinder block or table to allow the water to be gravity fed away from the room.

Once the room has lights and is climate controlled it's time to get your marijuana starts



# Chapter Three: Marijuana Varieties and Genetics

It goes without saying the foremost ingredient for your garden plan is the plants. In that case the variety of marijuana you chose is equally as important. When it comes time to fill your room with starts you have to decide which variety to grow. Marijuana varieties, also known as strains, vary widely.

## What's s Plant Variety?

Plants are labeled by levels of classifications. The classifications are identified by phenotypes (phenotypes are the different ways genes are expressed in an observable way). Classifications start with large inclusive groups that shrink via specificity with each step. All Marijuana falls under the identifying group known as its genus, cannabis. Cannabis is more specifically identified by three species, sativa, indica, and ruderalis (many plants grown for THC content are hybrids between sativa and indica). Finally plants are identified with greatest specificity by varieties.

Each variety's breeding history dictates its genetic potential. Varieties are bred by selecting plants to reproduce that exhibit desired traits such as cold hardiness, mold tolerance, large vegetative growth, high THC content, sweet tasting smoke, early harvest, or virtually any phenotype one may observe in a marijuana plant. Fortunately there are plenty of varieties out there that have been bred with 10 pound harvest potential. The varieties I suggest are known to thrive in a climate zone 9 of the US, south of the 44<sup>th</sup>, and north of the 37<sup>th</sup> parallel.

They are as follows:

Durban Poison - early harvest\*

Hindu Kush - early harvest

Elvis - mid harvest\*\*

OG Kush - mid harvest

Pineapple - mid harvest

03 - mid harvest

Blue Dream – mid-late harvest\*\*\*

## Lemon Kush – mid-late harvest

\*early harvest varieties mature Sept 30-October 9

\*\*mid harvest varieties mature October 10-20

\*\*\*mid-late harvest varieties mature October 21-November 5

You can obtain these varieties from local growers by clone or by seeds via online. If you are choosing seeds online try to choose heavy producers, early-mid harvests, and mold resistant. I encourage you to not buy feminized seeds. Feminized seeds often have hermaphroditic tendencies bred into them. Network with any possible nearby growers and research to find your local climate's most ideal varieties.

When choosing your varieties the ideal garden has equal parts early, mid, and late harvesting varieties. A grower benefits two-fold by evenly distributing the harvest times of their plants. For one it will stagger the harvest work. That's valuable as it takes hours to harvest a 10 pound plant. You don't want your plants to remain in the ground for any longer than they have to.

A timely harvest is beneficial because once the flowering buds mature they're more susceptible to mold, other malicious fungi, and a number of additional pests. If they aren't harvested in time you will lose buds to mold. Molded bud is compost and a total loss.

You may additionally benefit from having varied harvest times by efficiently using drying space. During harvest the drying room fills up quickly. Six 10 pound plants can easily fill a 600 square foot space. Imagine you totally filled your dry room with 6 plants of an early variety such as Durban Poison on October 6<sup>th</sup>. It's the best practice to take 3 days to dry your buds. That's 3 days until you can take anything off the drying lines.

However you could be in luck if you grew few enough early plants that at this point you have no more early plants left. So on October 9<sup>th</sup> you could take your dried material down, store it, and start harvesting and hanging your mid harvest varieties. If you still had early harvest plants in the ground in this situation you would need a much larger drying space. It's imperative to keep your drying space in mind when planning your garden. You don't want to spend all year growing a crop you can't properly harvest.

To conclude on the subject of varieties there are a couple traits in varieties you should avoid. Don't grow varieties known as or know for hemp. Hemp varieties are marijuana strains bred for their strong fibers, not THC content. Stay away from plants that are well known to grow small if you want the 10 pound average. Don't grow varieties that are of unknown genetic lines or the unknown products of variety crosses. I also don't advise you to choose varieties that harvest later than October. Only grow November harvesting strains if you feel comfortable in your knowledge of the local climate. This means you know the weather in November won't be freezing, raining frequently, or

otherwise be inhospitable for outdoor marijuana plants.

## Clones of Clones of Clones

If you are fortunate you may be able to obtain all of your starts as clones from an outside source. Nevertheless you only need to obtain at the least one plant or cutting of each variety you desire for your garden. You can grow these plants, called mothers, (grow mothers out under lights, indoors, and under the same conditions that are later specified for your starts) in the winter to provide yourself with a source to cut clones. The timeframe you should follow is:

Mothers growing by December 1

Clones cut by February 1

Clones transplanted by March 1

Once you have transplanted your clones and have the extra clones you want, compost your mothers to save indoor grow space.

If/when you obtain clones from another grower you will need to treat them as if they have pathogens such as spider mites and powdery mildew. When you initially receive them house them in a climate controlled indoor space under lights and in a room separate from your main growing room. This is your quarantine room. Most plant pathogens that your clones may have are incredibly contagious in an indoor grow setting. If you visit an infected/infested marijuana grow or any other distressed agricultural operation, shower and wash your clothes before you enter your indoor grow room again.

While clones/mothers are under quarantine spray them with 2 rounds of Azamax and Organicide over a week period. Create your spray formula with a gallon of water, ½ teaspoon of Azamax, ½ teaspoon of Organicide and a teaspoon of Dr. Bronner's liquid soap. Remember to mix your spray solution well. Apply your sprays with an electric or hand pump atomizer spray device.

Your crop can experience casualties or stunted growth if your starts are not healthy from the beginning. Watch your quarantine plants for symptoms of illness or pests and compost them if they are remarkably ill and/or not fast recovering.

### Common Clone Pest and Disease Symptoms

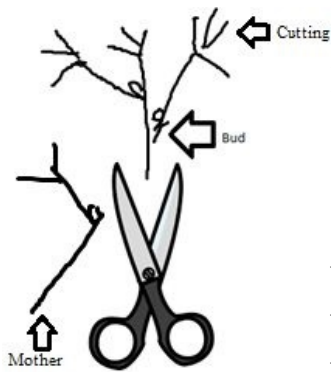
Aphids - Holes in leaves

Powdery Mildew - Large white spots on tops of leaves

Spider Mites - Small white spots on tops of leaves, spider webs, and black spots on bottom of leaves

Trunk Rot - Wet mushy trunk

## Cloning Tutorial



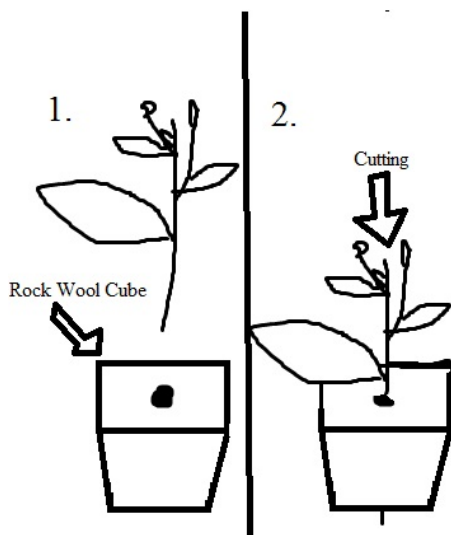
Utilize an E-Z Clone Machine, the preferred model clone machine, to begin cloning. Fill it to its specified fill line with water. Attach the water spraying apparatus to the water pump. Then submerge the water pump in the center of the

box. Fill your top with rock wool cloning medium cubes. Later you will place cuttings in these cubes.

Place the top on the box. When the pump is running it continuously splashes water on the bottoms of your rock wool cubes. The spray creates the ideal rooting environment by keeping the bottoms of the cuttings wet, but not submerged in water.

Before you begin making cuttings you need a sharp pair of grape harvesting scissors. Harvesting scissors are used in every stage of the grow plan. The preferred pair are 6 inch ARS harvesting scissors.

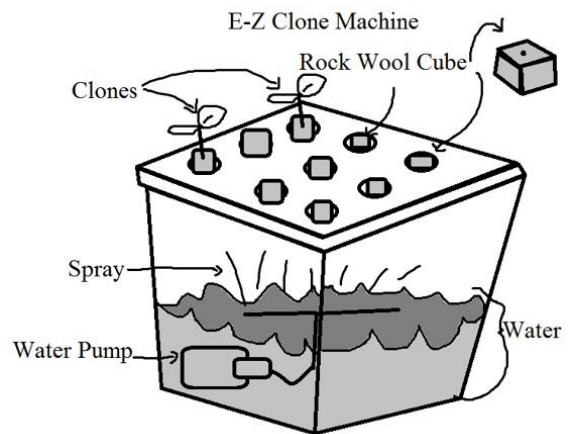
Make a cut on your mother plant below 2-3 buds and directly above a bud. Cut the stem a 45° angle, avoid cutting flat across the stem. Immediately immerse the bottom of your cutting in a jar of water. Cuttings are about 2-3 inches long. They are long enough that when placed in a rock wool cube there are a few centimeters of the base of your cutting exposed through the bottom. Additionally your cutting should be long enough to allow the leaves and bud material to not be pinched in the rock wool medium.



Make 30-100% more cuttings than the final number of plants growing in summer. Take more cuttings than you need to allow yourself a margin of error and failed clones. When you have more clones than needed you can select the hardiest and healthiest clones to transplant. Carefully label your cuttings' variety and all of your clones' varieties throughout your gardening career. A large sized plastic plant label marked with a grease pen works well.

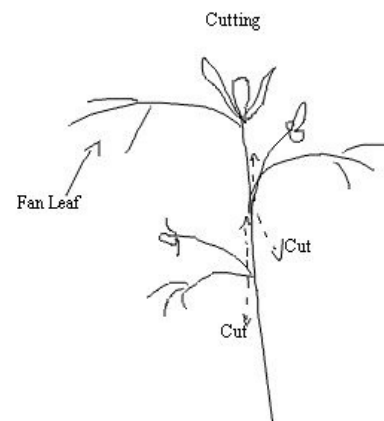
Once you have a jar of clones cut, process the clones one at a time in the following procedure. Dip the tip of the cutting in a rooting hormone such as Clonex. Place the cutting in your rock wool in the clone machine. Remove all the fan leaves and vegetative buds but the one at the highest part of the cutting. Turn the pump on once you have a clone in. Water will escape the box and slowly deplete the reservoir if the machine runs without every hole covered with a rock wool cube.

Start cloning in the beginning of February. The process will take about 15 days.





During these 15 days check your box every day, maintain the box's water level, spray the cuttings with water at least once a day, and remove any dead cuttings. You will not have a 100% cloning rate. Replace dead cuttings with fresh cuttings if needed. After a week look on the underside of the clones to check if they have roots. Transplant the clones to soil once they have roots of a half inch or more.



### Sexing and Flowers Tutorial

Marijuana is a dioecious plant. Dioecious means each individual plant typically has either only male flowers or only female flowers. Ensure your clones and seedlings you are going to grow are not males. Male marijuana plants are problematic for a marijuana grower for a few reasons.

The most potent and valued marijuana buds are 'sinsemilla.' Sinsemilla is Spanish for 'without seeds.' Marijuana female flowers are what is smoked, they produce sticky oils that contain the psychoactive ingredients that induce the intoxication that makes marijuana so sought after.

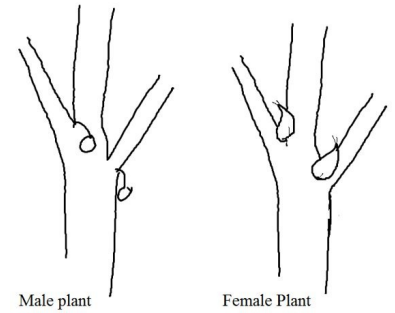
The female flower produces these sticky oils as an adaptation to catch male pollen floating through the air. So long as a female bud does not receive pollen it continues to produce more and more oils, trusting this will eventually catch some male pollen. So when a bud receives pollen it stops producing oils and begins the reproduction process to create a seed. Thus finding a seed in a bud is an obvious indicator the bud does not have a high concentration of the psychoactive oils. Hence sinsemilla bud is more valuable.

One pollenating male flower in the general vicinity of your female flowering plants can be detrimental to your entire crop, your neighbors' and any other nearby pot growers' crop. Marijuana pollen is known to be viable after travelling as far as 3 miles. Male flowers in your garden of females is generally the result of misidentifying your plants' sex when they are starts and growing out a male on accident. Also female plants can go hermaphroditic and grow male flowers. When part of a female plant grows male flowers or vice versa this is known as going hermaphroditic. Plants go hermaphroditic either because of breeding techniques (feminized seeds) or stress. Stress can be experienced as light leaks in your room, too cold, too hot, too humid, or many other plant abuses one could imagine.

If you have clones the concern for male flowers is not as important as if you grew seedlings. Seeds of course have a near 50-50 chance of being male. If you have a clone from a female mother plant then your clone is female. When growing seedlings you must grow at least 2 times as and up to 5 times as many seedlings as plants you plan to grow. Grow these plants until they are big enough to tell if they are male or female plants. You can differentiate the sexes of your plants by looking at their pre-flowers. Pre-flowers are

the basic forms of flowers that occur on your plant during the vegetative stage. They can be found at stem joints (nodes) along the plant. Notice male pre-flowers look like a ball hanging on a string. While female pre-flowers are shaped like an upside down teardrop with hairs on the tip.

Compost seedlings identified as males. Cull the worst looking females until you have the number of seedlings (plus 10-20% extra) that equal your desired garden size.



# Chapter Four: Start Growing Indoors

## Transplanting

In the beginning of March the clones are rooting and it's time to prepare a growing medium. Each plant will need a 45 gallon smart pot. Smart pots are a thick fabric based pot that promotes water release and prevents root binding. Fill the pots up with 80% with soil, leave a few inches of slack fabric at the top of the pot. A partially filled pot is a more efficient use of space because marijuana roots grow more laterally than with depth. Also the slack on the pot works as a handle for lifting. The soil for your pots is ideally an organic potting soil mix. Happy Frog by Fox Farm and Roots Organics are the favored brands. You can use either brand but avoid mixing the two soils in one pot. Purchase a 5-6 foot diameter kiddie pool for every 2 plants you intend to grow. Place 2 filled smart pots in each kiddie pool under one light.

Next create a mixture for watering in your plants. Watering in is the process of watering newly transplanted plants to encourage establish new root growth. Fill one gallon of water per plant in a 55 gallon drum. 24 hours prior to transplanting dissolve one teaspoon of Age Old water soluble mycorrhizae in the 55 gallon drum for every gallon of solution. Then immediately prior to transplanting dissolve and mix one teaspoon of Actinovate per gallon of solution.

There are a number of options for indoor irrigation systems and methods to administer water to your plants. I suggest you take a simple approach and use a hand watering method. Do this simply because of the short length of time your plants will be in the room and the small amount of water needed for each watering.

Use a 55 gallon barrel and a submersible pump with a garden hose. Your sump pump needs a garden hose attachment and a 110v plug. To operate the sump pump thread a garden hose to the pump's threaded outlet, submerge it in your solution, plug in the pump, and spray with the hose end. Always keep your pump fully under water, don't allow your pump to pull air.

Begin transplanting after your smart pots are filled with soil and your water solution is prepared in your 55 gallon barrel. Dig a hole in the center of the smart pot with dimensions that are twice the length and width and the same height of your clone's rock wool cube and roots. Water the entire pot to about 50% saturation with water that is not mixed with your solution. The soil should be wet but not so wet that water is dripping through the bottom of your pot's cloth. Next spray close to a half-gallon of your solution on the hole in your pot. One way to determine your hose flow rate is filling a gallon bucket or jug and timing it.

Place your plant and rock wool in the hole. Then build up the soil around the rock wool. The top face and ¼ inch of the rock wool is left exposed. Then use an additional half-gallon of your solution to saturate the rock wool and water the plant's surrounding 4

inch diameter of soil.

As you plant out choose which clones you are going to keep, which you are going to cull, and which you will save as backups. The clones with the most potential are the largest, have the most vegetative buds, and have the most roots. Save enough extra clones such that you have at least a 5% population backup of each variety. You can transplant the clones you are saving into to 1 gallon pots until the time is right to replace a clone or compost the reserves. Cull the clones with symptoms of relative bad health, regardless of their roots and size. Some characteristics of unfit clones are, crispy drooping leaves, brown spots on any part of the plant, or no definite vertical stalk.

Position two plants in a kiddie pool under each light once you have your plants watered in. The plants are placed such that they share the light equally. Lower the light over the plants. Allow a 20-24 inch heat buffer between the highest point of your plants and the glass of your hood. As the plants grow raise your light to maintain the buffer area. The 1000 watt lights emit intense heat. You can test if your light is too close to the plant by placing your hand under the light where the top shoot of the plant is. If you feel an uncomfortable heat on your hand the light is too close. Plants' leaves and stems begin to burn that are too close to the lights.

# Chapter Five: Indoor Irrigation

Check your plants' moisture every day, twice a day. Pick the pot up a half inch to check your plants moisture. The lighter the pot the dryer the soil is. If the soil feels and looks dry that's another cue for a thirsty plant. Keep track of moisture levels whenever you enter the room. It's important to water when your plant needs it. Avoid watering too frequently and too infrequently. Over watering your plant a single time distresses the plant more severely and for a longer period of time than missing a single watering. When a plant is over watered it has difficulty with osmotic pressure and respiration (moving fluids and gases through the plant) and this inhibits all of the plant's cellular functions. When a plant is under watered the extremities wilt as all of the water is held in more important areas. Provide water to a wilting plant and it can recover in 24 hours. Stop watering to dry out an over watered plant, and resume watering in small amounts over time. Full recovery from over watering can take up to a week.

An over watered plant and a thirsty plant look similar. They have drooping and sometimes curling leaves. However a dry plant's leaves will feel crispy and would crumble in your fingers if you were to attempt. An over watered plant's leaves feel moist and leathery. Assess your previous watering schedule, the soil, and the plant's moisture to decide if your plant needs to dry out or needs water. Ideally your plant should not reach a state where it is has been negatively affected by over or under watering practices. However it is possible to bring them back to health from these states of duress.

The plants' roots will only reach a close vicinity of where they were transplanted the first few times you water. Water the soil close to the stalk of the plant in order to wet the plant's roots when you water. It's also necessary to saturate all of the soil in the pot because roots tend to grow into wet soil.

When you water do not spray the stalk or any above ground part of the plant. When watering set your spray nozzle on a low pressure shower setting and keep your nozzle in a constant circular motion around the plant and the edges of the pot. Spray the soil evenly across the top without delaying in one position for too long in order to prevent erosion and to not unevenly wet the soil.

You may know that the plant has sufficient water when the smart pot begins to drip from the bottom on all sides of the plant. Time how long it takes to water and reach this point of saturation. Then you can give your plants the same amount of water the next time you water. It's good to have an estimation of how much water your plant will need and how often it needs to be irrigated, but these factors won't remain constant. As your plant grows you may find it drinks faster and you have to water more frequently, or it may take more water to saturate your pot because the roots will hold the water and cause it to not run through the soil as fast.

The first time you water after watering in, water with a liquid fertilizer infused water

source. Fill your 55 gallon barrel up to your estimated water needs for the watering and mix in your nutrients (following GRAPH A). Use a shovel to mix and blend your liquid nutrients in 55 gallon barrel. Use your liquid plant food in a cycle of 4 times on and then once off (use only water). Whenever you water, vacuum out the water that collects in the kiddy pools your smart pots are sitting in. Use a wet shop vacuum to do this safely.

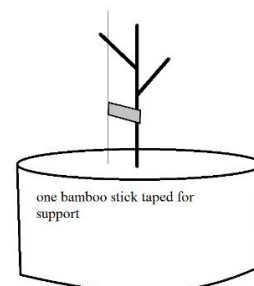
Liquid nutrient products Botanicare Pure Blend Pro Grow and Botanicare Liquid Karma are the prescribed nutrients for this stage in of development. When you start feeding your newly transplanted clones you will ramp up the liquid nutrients in ml per gallon as per GRAPH A. If your plants react with 'burning' spots on the leaves you will need to remove all nutrients and use water only for 2-3 waterings.

Your plants will likely need water every 24-48 hours while in indoors. Yet when the plants are smaller and recently transplanted the pots will take a longer time to dry out completely. Be aware that ysou may have occasions when the pot is wet and the plant is thirsty because the roots can't reach the moisture. If this occurs you can water at the base of the plant and leave the rest of the plant pot to dry.

# Chapter Six: Indoor Plant Support and Shaping

## Support

Your plants need extra support and stabilization from the beginning. This plan's more than ample growing conditions encourage the plants to grow much faster than they ever would in natural circumstances. Also the plants' shape needs to be maintained and adjusted to best support its own weight.



Early on in the season the plants' stalks are stabilized and shaped by placing 2 foot long and ½ inch thick cured bamboo sticks 6-10 inches into the soil on 1-4 sides of the plant within 4-5 inches of the base of the plant. Then plant tape ties are tied to the trunk of the plant and the bamboo sticks to guide the plants to grow perfectly perpendicular to the ground. Leave space for growth when plant tape is tied to the plant by looping not wrapping. Your tape on the plant should be looped such that the tape only touches one side of the plant. Wrapping the tape all the way around a plant trunk or branch will choke the vascular system.

Frequently check the plants for outgrowing their plant ties, their stability, and upward growth. More bamboo sticks can be added as the plant grows and/or established sticks can be adjusted to assure a straight up and down stalk. Without support and guidance your plants are likely to break branches and grow into inefficient shapes. An unsupported plant could slant to one side and it would be a matter of time until the stalk broke or the entire plant came uprooted from the weight of new growth.

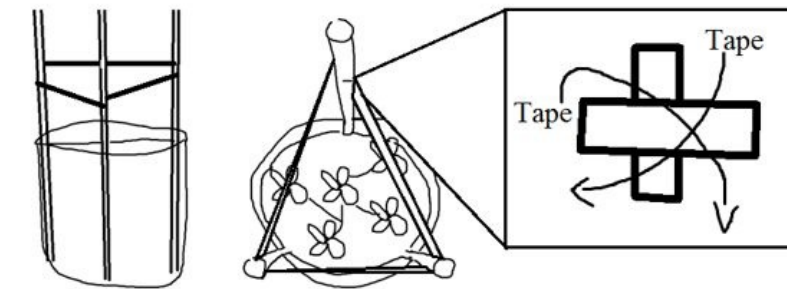
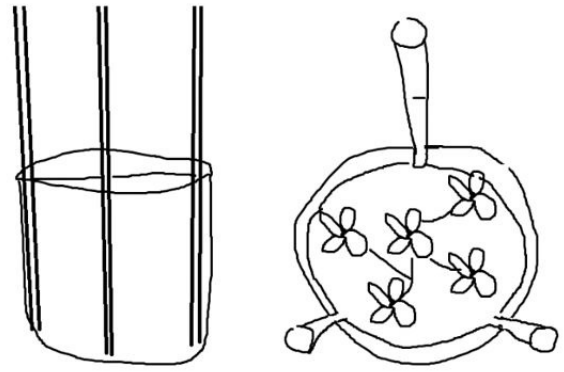
## Shaping and Extra Support

In the second half of indoor growth (April) your plants will begin to need supplemental support. It's always more efficient to support a plant before it needs it. Place a 4 foot 1.5 inch thick bamboo along the inside wall of the smart pot in three equidistant positions. The stick should be buried with the downward tip touching the bottom of the pot. The buried part of the stick stands between soil and smart pot fabric.

Next attach your three vertical bamboo beams to each other with three horizontal bamboo beams. The horizontal beams are attached perpendicular to the vertical beams. The horizontal beams are staggered in height placement from the lowest branch of the plant to the top 10% of the plant's growth. To secure your beams use Gorilla tape in a 3 layer application rate on alternating corners of your beams' cross shaped intersection.

The beams should be secure to one another such that the entire structure moves as one if you apply any horizontal force.

Now that a support structure is in place the plants are attached with plant tape ties. The stalk of the plant is fastened with plant tape in a vertical stance. The stalk of the plant is tied three times. Each plant tie to a different horizontal bamboo

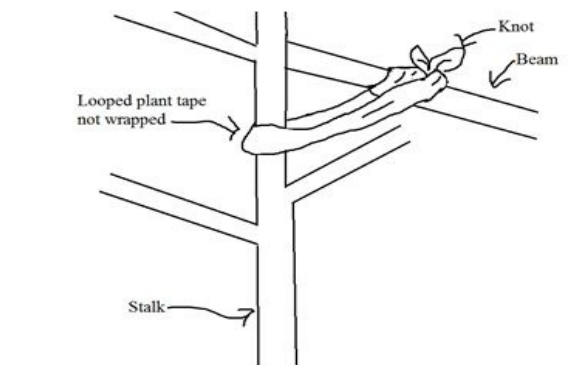


weight of the branch.

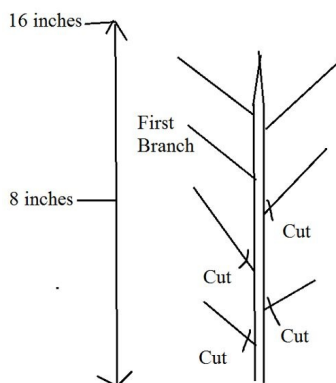
### Shaping and Pruning Your Plant

Consciously shaping your plant at the beginning stages of your grow is essential. Beneficial shaping of a plant can boost the plant's output and create a well-supported and healthy plant. Plant's that are badly shaped or left to their own proclivities will lower output, break branches under stress, and can be exposed to disease. It's imperative to shape your plants and to shape correctly as some initial shaping decisions can't be reversed and mistakes can incur costly remedies.

beam. Next address the plant's branch support. Move branches that are near your horizontal beams so they lay on the beam. Branches that are sagging can be tied to the nearest vertical beam to relieve some the



Whenever using plant tape it is important to not strangle your plants' vascular systems. Your tape on the plant should be looped such that the tape only touches one side of the plant and knotted and wrapped tight to the support



The first step to shape a plant is by choosing where your first branches begin on the stalk. 8 inches is the preferred height for your plant's first branch. Branches that begin lower than 8 inches on the stalk of the plant are a risk to the plant later in growth. Very low branches can touch the soil or be exposed to water from the outdoor irrigation system. Plants become vulnerable to disease if their branches are consistently subjected to soil or irrigation.

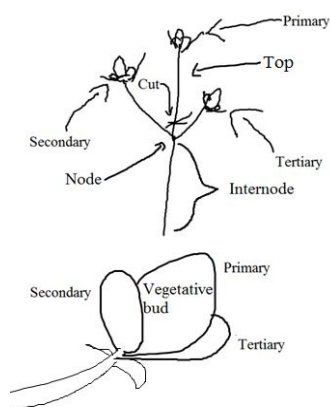
In order to prevent low branches you can cut the lowest branches off the stalk until you reach the first stalk at 8 inches. Allow your plant to bud upwards as a straight stalk and cut the all branches that fork until you have your first



branch. Do your cutting slowly over weeks as to not leave your plant with too few leaves. Whenever you are cutting or pruning a plant never take more than a third of its vegetative material per sitting. The plants need a week or so to recover from heavy losses of material. Conversely if you wait too long to cut your undesired branches you will waste the plant's energy.

You can also train your plant to grow a branch at 8 inches sooner by finding the stalk's center shoot and cutting the forked branches off at the tallest node (a node is a junction of stems). Cutting the forking branches forces the plant to dedicate its energy to growing straight up. You will effectively have one consistent trunk shooting directly upwards. Again, this process is done over time to not shock the plant from too much cutting and to allow your plant to hold plenty of leaves.

### Topping the Tops



An additional way to shape your plant is a technique known as topping. In order to fully explain topping we require some background on the vegetative growth structures of a marijuana plant.

Marijuana vegetative growth springs from vegetative buds. Each complete vegetative bud that grows on your plant has a primary, secondary, and tertiary vegetative bud. These divisions of the bud fork into 3 shoots, each with another complete vegetative bud.

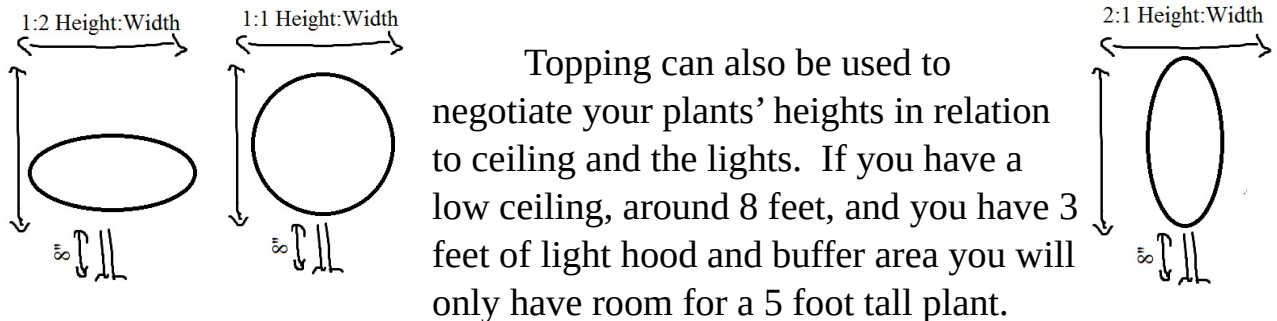
The leading and tallest shoots/buds on your plant are called tops and cutting tops is known as topping. Topping shapes a plant by removing the apex growth to encourage lateral growth. Once the tallest shoot is cut, the energy that was once going to that cutting is directed to the remaining tertiary and secondary shoots. These shoots are now the new tops. Every time you top you create more tops and make a wider growing plant. It's considered relatively advantageous to have more tops. Tops are prized because they develop to make more tops and when you enter the flowering stage your tops are your most productive parts of the plant known as colas.

It's crucial to have a balance when topping. Imagine if you never topped. You would have a leggy and thin 10 foot tall plant with 12 tops. That would be an inefficient way to grow for big yields. The other end of the spectrum would be topping too much and growing a 2 foot tall plant with 50 tops. A plant like that would be too wide and it would likely break under its own weight.

#### Some measures for successful topping are:

1. Only top during the indoor stage of growth.

2. Only top on a weekly to bi-weekly rate.
3. When you top cut a length of the shoot that is the distance between the tip and the immediately previous node. Cutting longer lengths when topping can lead to undesirable and dramatic changes in your plants' height and width ratio.
4. Do not allow a plant to grow so tall or cut tops so wide that the plant grows outside of a proportion of a 1:1, 2:1, or 1:2 height to width ratio.



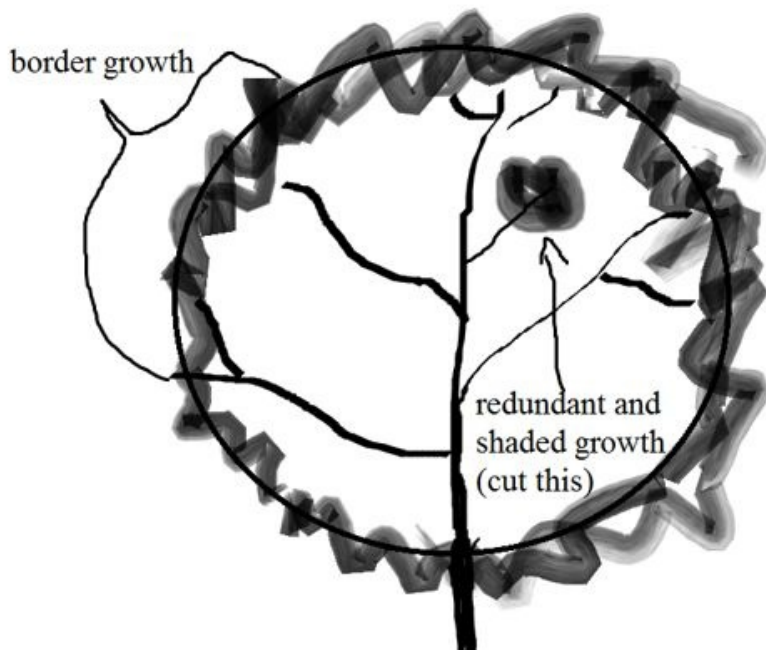
You may have to top to curb upward growth on your plants in the last weeks of April and first couple of weeks in May before the plants go in the greenhouse.

To conclude support and shaping, remember when checking your room observe your plants' support system. You may need to adjust bamboo sticks to ensure straight stalks. Also check your plants' shape. Decide if you need to top according with the plant's 1:1, 2:1, or 1:2 height to width ratio.

## Pruning

Pruning is cutting excessive and redundant leaves and branches from the plant. There are 3 goals of pruning. One is to cut out leaves that are so shaded by other growth that they aren't providing a net gain in energy. Second is to remove branches that are not contributing to increasing the overall border and size of the plant. Third is to remove branches that won't receive enough sunlight to be heavy producers. Every plant grows branches and leaves in the shadow of the border growth. You will need to prune all of your plants multiple times throughout the year.

When you prune you cut out the inside growth that is shaded out by outside border growth. Prune branches and leaves that are not a part of the edges of the plant's growth. You want to prune a 4-6 inch thick (thinner for smaller plants) globe of vegetative space with an empty inside. You need to collect all pruned material and remove it from your room after every pruning session. Carry a 5 gallon bucket around with you and fill it with discarded leaves and branches as you work during the indoor growth stage.



You know it's time to prune when your plants' are thick with leaves and you can't see through the plant from one side to another. A well pruned plant has no growth that is not a part of the border growth and a robust layer of leaves and vegetative buds on the border. You can see through to the other side of a plant when it is well pruned.

## The dos and don'ts for pruning

### Do

- Do cut out totally shaded leaves in the center of the plant
- Do cut out branches that have no part exposed to light
- Do leave a good amount of growth at the border of the plant
- Do cut the shaded growth off of a larger branch that has parts that are in the light
- Do cut at the base of an unwanted leaf or branch
- Do leave leaves on the end of every branch
- Do retrieve all pruned material and dispose of it

### Don't

- Don't leave lengthy stubs behind when cutting out material
- Don't cut out branches that are mostly shaded but the tip is exposed to light
- Don't leave pruned material in the room, or worse, in the plant's pot
- Don't cut every piece of vegetative material off of a branch except for the last few buds
- Don't pull and strip material off the plant without scissors
- Don't use scissors that may be infected with plant pathogens (possibly from another grow)

# Chapter Seven: Spraying

A regimented spray system is the best way to prevent a crop failure due to pathogens and various pests. Before I present the spray routine instruction, it benefits you to be reminded to follow the safety precautions that are provided on your spray products' containers. Wear your Personal Protective Equipment (PPE), when working with spray products, mixing spray formulas, and spraying.

Your spray routine during this indoor stage of growth utilizes a Hudson Electric Atomizer. The atomizer is ideal for your indoor and greenhouse sized plants. The sprays for indoor growing include Actinovate, Organicide, Doctor Bronner's Liquid Soap, Plant Doctor, Liquid Companion Fungicide Spray, Liquid Karma, and Azamax. These sprays will be split into 2 separate formulas to be used on a 7 day cycle. The Azamax spray is used in its own formula as an adjunct spray routine to your main cycle.

## Indoor Spray Cycle:

Spray Day 1 Formula: (applied via atomizer) 1.5 teaspoon Actinovate, 1.5 ounce Organicide, 1 teaspoon Doctor Bronner's liquid soap, 1 teaspoon Liquid Karma, and 1.5 Gallons of water

No Spray for 3 Days

Spray Day 5: (applied via atomizer) 1.5 teaspoon Plant Doctor, 2 teaspoon Companion, 1 teaspoon Liquid Karma, and 1.5 Gallons of water

No Spray 2 Days

Spray Day 8: Repeat Cycle

Azamax is applied outside of this regiment. Spray .5 ounce per gallon at week 2 and at week 6 as a preventative measure.

When you make your spray formulas add your water last. Shake and agitate your formula with the container sealed before your spray to evenly mix you ingredients. Also agitate your spray formula intermittently to ensure an even mix during application. The spray should applied on the top and bottom of leaves until you can observe spray dripping off the plant. Spraying should ideally be done within an hour after watering and soon after the last dark period in you room.

## Troubleshooting

| Symptom                                | Diagnosis                   | Prognosis                                            |
|----------------------------------------|-----------------------------|------------------------------------------------------|
| Dry, drooping leaves                   | under watered               | water                                                |
| Leathery and/or drooping leaves        | over watered                | stop water for at least 24 hours                     |
| Yellow burning spots on leaves         | nutrient burn               | water without nutrients then lower rate              |
| Yellow burning spots on leaves         | light burn                  | Raise lights                                         |
| Drooping leaves with good water levels | humidity stress/temperature | crank fans and dehumidifier to lower humidity/temp   |
| White dots on leaves with white webs   | spider mites                | Azamax treatment spray (application rate on bottle)  |
| Broken branches                        | structure stress            | Make a clean cut at branch or seal incomplete breaks |
| Discoloring yellowing of leaves        | pH/nutrient lock out        | flush soil with Clearex                              |

# Chapter Eight: Indoor Checkpoint

Now that we have a general outline of what steps are needed to grow out your clones let's look at what the day to day procedure should look like.

## Lights

Each day you should check your room twice, once before the dark cycle and again when the lights come back on. Whenever you check your room you should generally go in when the lights are scheduled to be on. Check every plant to confirm your lights are far enough away to not burn your leaves. The lights are raised whenever they are too close to the plants top levels of growth. You can keep a 24 inch bamboo shoot and place it between your all of your lights and plants to guarantee there is enough space between the two. Also you can place your hand under the light to test for heat stress. The light is too low if the light feels too hot to keep your hand where the plant's leaves are.

Occasionally check to ensure your lights are turning off when they are scheduled to. Anytime you open your dark room up to light you stress the plants. If you happen to expose your dark room to an extended amount of light you can switch the lights on and leave them on until the next scheduled dark time. If the plants experience a short break in darkness they can perceive it as a very short day. Very short days trigger flowering.

## Environment

Next you need to check your environmental elements. Your temperature should read between 75-85°F and your humidity should be 50%. If you are not getting these parameters you can add fans or dehumidifiers. It is unlikely that your temperature could fall below 75°F with 1000w lights, but if it does you should add heaters with an adjustable thermostat. Check your equipment is not malfunctioning. Your exhaust and intake fans' temperature trigger should be set to switch on at 85°F, your dehumidifier should be displacing water outside of the room or in a bucket that you are emptying with enough frequency. The air in your room should be moving. Plants can create their own bubble of high humidity if the air in the room is not being moved by smaller fans.

## Plant Moisture and Irrigation

Check your plants moisture levels. Decide to water by noting a number of conditions. Lift the plant and if it's noticeably light, the smart pot is dry on all sides, and

the topsoil is a lighter color grey (relative to its wet color, a darker black) it's time to water. Take note of how long you water and how frequently you water. Water each plant with the same amount of water.

After the first 28 times you irrigate you can meter your Pro Grow up from 15ml/gal to 20ml/gal. Increase 1ml/gal each time you water until you reach 20ml/gal. Leave your Liquid Karma doses the same. Watch your plants' reactions as you increase your liquid feed. If your plants react with 'burning' spots or curling on the leaves you will need to reduce all nutrients to 0 and use water only for 2-3 waterings.

On week 5 of your indoor grow a salt flushing solution known as Botanicare's Clearex is used. Water your plants with their typical amount of water with Clearex added. Clearex is used at a 1 ounce per gallon application rate. It is important to use only Clearex and no other liquid nutrients for this watering.

### Spray

In addition to all of your daily tasks remember to continue your spray cycle. Inspect your plants for leaf burning and curling after every spraying. If your plants are having a negative reaction to the spray you may need to try cutting down on some sprays. You can find out which product is damaging your plants by trying one spray/water formula at a time on one leaf as a spot check.

### Indoor Conclusion

Your indoor grow stage proceeds through March, April, and into May. You will develop vigorous, supported, pruned, shaped, and well fed plants. The plants will begin to use up more and more space in your room. They'll start bumping into each other and inching closer to the lights. Just as your plants begin to outgrow all the available growing space in your room it will be time to move them outdoors.

The second stage to the grow plan is growing out your plants in the greenhouse. It's time to move your plants out of their small indoor confinement and into a large greenhouse space. Moving your plants into the greenhouse will acclimate them to the lower night time temperatures and natural light cycles. The additional space will allow them to achieve more of their height potential.





# Stage Two: Green House



# Chapter Nine: Greenhouse Setup

The ideal greenhouse for 24 plants is 40 feet long, 16 feet wide and 12 feet tall. The greenhouse preferably has full sun. The greenhouse should have the capability of opening and closing the ends. The ground inside is covered in pallets to set your plants on. At least 3 1000w MH lights are hung from the spine of the green house and their corresponding ballasts should be secured to a pallet and never on the ground. The hanging cords are be secured and tied with stapled strings identical to your indoor setup. Your ballasts are plugged into a 220v MLC with a 110v trigger.

The 110v trigger is plugged into a timer to turn the light on before sunset and before sunrise. The lights are scheduled to turn on an hour before sunset and then turn off later in the night. Then they are scheduled to turn on in the morning and off again after the sun is fully over the horizon. Calculate the days' sunlight hours and have these two blocks of light time to supplement the plants day light and experience 18 hours of light. Slowly reduce the amount of supplemental light hours such that your plants are weaned off all supplemental light by June 14<sup>th</sup>. The supplemental light ensures that your plants don't go into flower by experiencing dramatic downward shifts in daytime lengths.

Manage the environment to similar strictures of your indoor room. Remove your exhaust/intake 6 inch fans from your room and install them in your greenhouse. You can mount these fans on the frame of the greenhouse on opposite ends at about 6 feet high. These fans should be plugged in to your temperature sensors and set to turn on at 85°F. Set your fans to blow in the same direction. One fan can take in air from the east and the other fan can exhaust to the east. Then mount 2 oscillating wall fans and 2 stand oscillating fans for every ~600 feet. Place two 10 feet inside and the others 30 feet inside. Both wall fans are mounted at 6-10 feet high.

Use a temperature gauge that records daily lows and highs. If your greenhouse gets hotter than 95°F you can place extra box fans and standing oscillating fans inside. Turn off all fans 2 hours before sunset. The ends of the greenhouse are opened every morning and closed every night to help hold heat at night and to help move air and cool the greenhouse during the day. The greenhouse is left open once night time temperatures don't dip below 45°F.

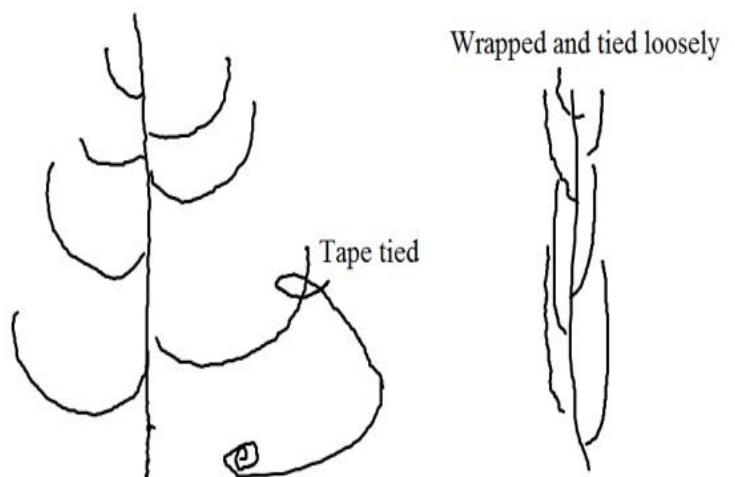
## Moving the Plants

It's important to move your plants out at the right time. It depends on where you grow, but the second week in May is a reliable target date to move your plants on. Ideally the average low temperature outside should not be lower than 40°F. Your timing for moving your plant may also be influenced by their burgeoning size. Move your plants out

in the early morning. The afternoon sun increases any stress your plants will experience in the move.

Plants at this stage in the program can be 5-6 feet tall. Plants of this size need to be prepared and bolstered before they are moved. If you are not vigilant about your support systems and how you move these plants they can snap at the trunk, lose limbs, and break in half. Polyethylene baling twine is looped in 3 instances at the base of the plant, one tie for each vertical bamboo support to secure your plants. Then 2 feet up from the base of the plant 3 more loops are made on the 3 vertical bamboo. Finally 3 ties are made from each horizontal bamboo support beam the center of the plant. All ties should be tied tight enough there is tension, but not so tight they loosen other ties.

Secure your widest weightiest branches once your plant is vertically tied. Tie green plant tape to the end of a long wide reaching branch. Then circle around the plant with the tape and gently lift horizontal branches up and closer towards the center of the plant. Then loosely tie the tape. This can be done as many times as needed to secure all of the plant's more wide and horizontally oriented branches.



Before you move your plants you should know this is a task well suited for at least two people. After the plants are secured grab the top of your smart pot at the slack fabric and lift your plant a few inches off the floor. Move it through the room's door and place it outside. When you lift be careful to not hit the ceiling or light hoods with your plant. When you move through the door you may have to position your plant at a diagonal to allow the height of your plant through the door frame. Move a wheelbarrow up next to the plant. Lift your plant up, over, and into the wheelbarrow. Place the pot in the wheelbarrow with the plant perpendicular to the ground. When you lift it is important to keep the motion of your plant straight up and down.

Wheelbarrow each of your plants into your greenhouse and evenly distance them on the pallets. Once in the greenhouse, cut all of the green tape wrapping you made. The baling twine ties can remain as extra support for the plant, but be sure none of the ties will restrict the plant's vascular system.

### Greenhouse Growing

Now that your plants are in their new spacious environment you will maintain a similar routine as your indoor growth stage. Continue to use your 55 gallon barrel paired

with a sump pump to water your plants. When your plants are first moved you will initially continue water with the same liquid nutrient ratios (20ml/gal Pro Grow, 5ml/gal Liquid Karma) however you must up the total gallons you give your plants.

After your plants have been in the greenhouse for 3-4 days you can begin upping your Pro Grow ratio one ml per week. Once you have reached 22ml/gal stop increasing your Pro Grow. Remember when hand watering don't water until your soil is dry and when you do water fully saturate the soil of every plant. Only wet the soil and roots, leave the trunk, leaves, and branches dry.

Pruning your plants should be taking longer than ever. When you prune in the greenhouse remain disciplined about keeping all pruned material out of your plant's space. You will need an 8 foot orchard ladder once you can no longer reach all of your plant's pruning needs. In addition to your orchard ladder a Corona long reach pruner is a useful tool to extend your pruning reach.

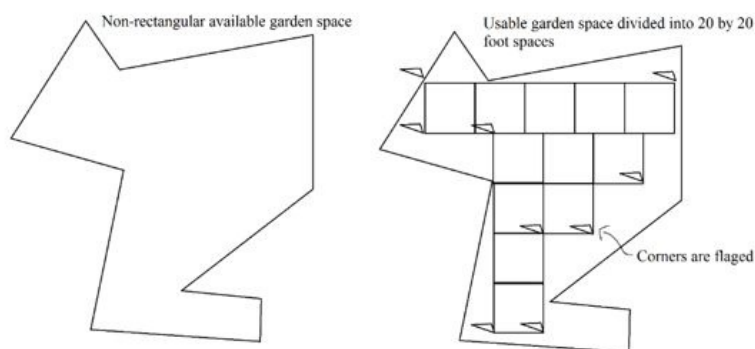
Observe your plants' support needs as they grow. If you see sagging branches you can use plant tape tie to secure branches to the bamboo frame or other branches of the stalk. As your plants grow you may have to add more vertical and horizontal bamboo support. You can lengthen your bamboo frames by attaching more bamboo as an extension. Also you can tie the bamboo support frames of each plant to one another and the framing of the greenhouse.

# Chapter Ten: Preparing Your Outdoor Space

While your plants are growing in the greenhouse you will need to prepare your outdoor growing space. The outdoor garden will have full sun with no trees or structures shading out the plants' space at any time during the day. The garden will need a 20x20 foot space for each plant. Each individual plant will be in a 600 gallon smart pot that sits on a ~7ft x 8ft pallet platform. Each platform will have 4 T-posts, one at a diagonal of each platform corner, for tying trellising. The garden needs the grass and shrubbery cut back to a 1-2 inch growth. If your outdoor space doesn't have a fence tall enough to keep out deer you will need an 8 foot tall perimeter deer fence.

Begin marking out the dimensions of your garden. Equip yourself with a 500 foot spool of surveyor string, 100-300 foot measuring tape, and 4 stakes. Find and stake the 4 corners of the boundary for your garden. Your garden's boundary's length and width should be divisible by 20 foot increments. Each 20 foot increment in width and length is space for another 600 gallon pot. Suppose you have space for a 123 foot wide garden, then cut the boundary short to only 120 feet. If your garden is not shaped like a rectangle divide it up into rectangular parts and stake the corners. Once your corners are staked, line surveyor string around the flags to mark the parameter.

Raise your fence along this stringed parameter. The fence will be built using 10 foot T posts and Tenax C-Flex 8x100 foot deer fencing. If you already have a suitable fence, erect the T posts and neglect the deer fencing. The T posts of the deer fence are used for plant support later.



To begin building your fence, drive one 10 foot T post in the position of each of your flagged corners. Drive your T-posts in with a T-post pounder while standing on an 8 foot orchard ladder. All T-posts are driven into to the ground just deep enough to bury the forks on the bottom of the post. Use your tape measurer along one side of your string perimeter. Mark every 20 feet with a wire marking flag. Do this for every side and finally drive a T-post in at each flag's location.

Thereafter your T-posts are in place, begin fencing. Since this is lightweight plastic deer fencing, zip ties are the ideal method for attaching your fence to your T-posts. Attach the fencing with 3 zip ties per T-post, one on the bottom one at 4 feet and one at 8 feet. As you proceed from one T-post to another, zip tying fencing, provide ample tension in the fencing from T-post to T-post. When you are on the last segment of fencing attach a zip tie only at the top of your fencing. You can swing the last segment and use it as a gate. Secure your gate to the final T-post with a 6 inch carabineer to allow easy access.

Begin placing wire marking flags where your plants are going to go. Your first flag should be placed in a far corner boundary of your garden. The flag must be 10 feet from both sides of the corner. Once you place a flag in the ground there you have found your first plant's center. Anchor the end of your measuring tape here.

Walk your measuring tape over to the opposite boundary of your garden. Place a flag every 20 feet. Once reach the garden boundary measure 20 feet over and place a new flag and walk back towards where you started flagging, placing a flag every 20 feet again. Do this process until you have filled all of your garden's available plant spaces with flags. Remember each flag is the center of the location for a plant and each flag should be 20 feet from one another and the flags by the fencing should be 10 feet from the fencing.

Now that your flags in place, assemble pallet platforms for your pots. Make a platform centered at each plant marker flag. The pallet platforms allow airflow underneath your pots and protects them from pests, such as gophers. Use 4 standard sized pallets (48x40 inches) to form a 96x80 inch rectangle with your marker flag at the center. Use a level tool check the level of your platform. If your platform is not level you can build up the earth or dig down beneath it to adjust.

Pull out your marker flags and place a 600 gallon smart pot on the center of each platform. Each pot will take about 40 two cubic foot bags of Roots Organics or Happy Frog potting soil. You can get the best pricing on potting soil if you buy by the pallet (usually ~60 bags per pallet).

While filling your smart pots it's important to keep the walls of the pot straight up and down. The smart pot sides can bow in or out throughout the filling process and alter the cylindrical shape of the pot. An imperfectly shaped smart pot holds less soil. There are a few procedures to prevent the pot's sides from bowing.

Distribute soil evenly around the pot with an iron rake after every 3-4 bags of soil are added. The walls and soil should be shaped on all sides of the pot after every 10 bags of soil. Pull the wall of a smart pot up tight and press the soil down against the inside wall of the pot. The walls of the pot are supported and shaped upwards as the soil is pushed down and outward from the center of the pot.

While filling your pots it is important to add dry amendments. Before you begin mixing a smart pot you need two wheel barrows prepared with amendments. One wheel barrow will contain 3-4 cubic feet of composted chicken manure. The other wheel barrow will contain this recipe:

Alfalfa meal 9 lbs.  
Bat Guano 3 lbs.  
Fish bone meal 15 lbs.  
  
Humic acid 15 lbs.  
Langbeinite 3 lbs.

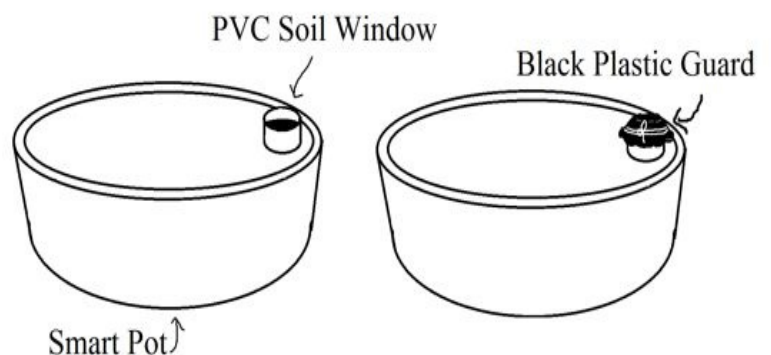


Azomite 15 lbs.  
Green sand 15 lbs.

When you make this recipe wear a respirator and gloves. Mix your recipe with a shovel in your wheel barrow after the addition of each ingredient. When the final amendment is added mix until the contents are homogenous.

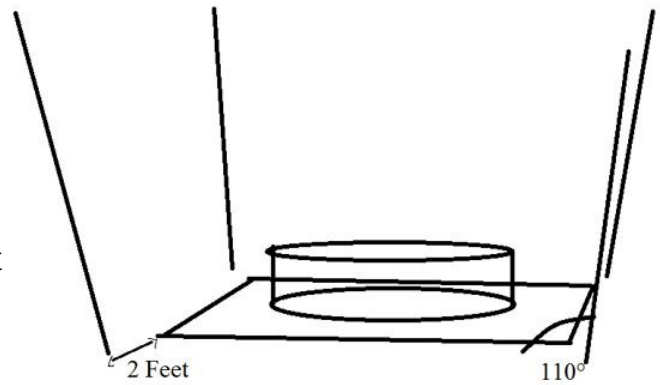
As you fill your smart pot with soil add in 1 shovel full of each wheel barrow's amendments for every 2 cubic feet of soil you fill. Mix the soil in with an iron rake each time you add amendments. The wheel barrows should be empty by the time the pot is full. If you don't seem to be running out of amendments at the same rate your pot is filling up adjust your shovel loads accordingly.

For every 12 pots you create a soil observation window in one pot. This window is a 3 foot long cutting of 6 inch in diameter PVC piping. The window allow you to reach down to the bottom of the pot and feel the soil for levels. As you fill the pot with the first 3 inches of soil place your pipe in the pot such that the pipe will stick out of the top 3 inches of soil and rest on the bottom 3 inches of soil. Orient the window 6 inches from the edge of the smart pot. Cut a piece of black plastic to completely cover the top of the PVC and tie baling twine around the plastic to secure it in place. This black plastic guard will protect the soil in the window from sun exposure.



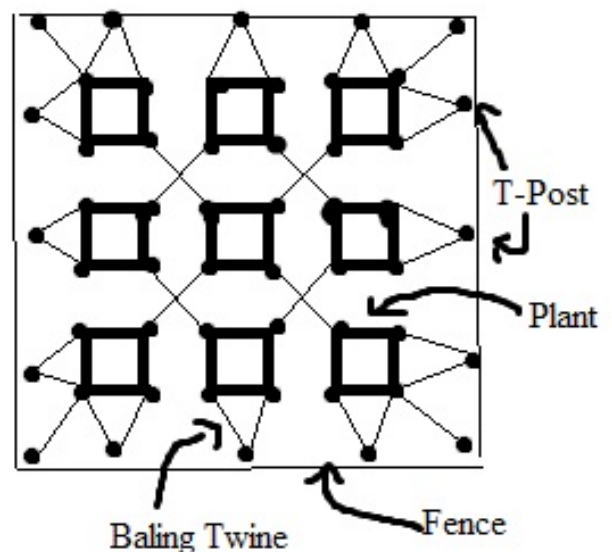
## Trellising Support

Now that all of your pots are filled it's time to raise T posts for the plant's trellising system. The T-posts are 10 foot tall and they are placed 2 feet diagonal from the pallet platform corner. When pounding these T-posts drive the top pointing away from the pot at a  $\sim 110^\circ$  angle.



The trellising system utilizes trellising plastic net layers to support the plants. The trellising is tied tight to the 4 t posts around the pot. The T posts around the pot are tied to the T posts of the fence. The T posts are all tied together to create a network to distribute the stress on the plant support system. Where the wind or weight of plant could pull down a single T post, this system bolsters the trellising by employing the strength of baling twine and all of the T posts in the garden.

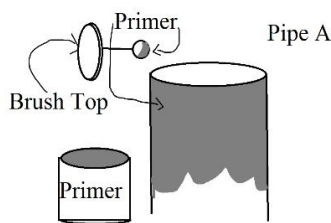
The T posts can be tied to one another before a single layer of trellising is in place. Use your orchard ladder to reach the top of your support T-post. Grab the end of your baling twine and leave one end uncut in the spool. Take the cut end and wrap around the top of the T-post twice, tie an overhand knot, and then tie a slip knot. Move your ladder to the T-post that is directly diagonal to your tied post. Then, while keeping your twine taut, cut your string at about 8 inches past where the string meets the second T-post. Loop the baling twine twice, tie an over hand knot, then a slipknot to the second T-post to tie the 2 t-posts to one another. Don't apply so much tension that you bend your T-posts' stance. Continue to tie every T-post to a corresponding diagonal T-post. This will include your fence T-posts, fence T-posts, except corner T posts, will have 2 baling twine lines tied to it.



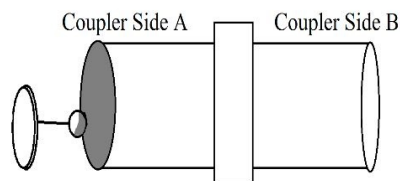
# Chapter Eleven: Irrigation Line Assembly

The final step for preparing your outdoor space is your irrigation lines. Your irrigation system will be made up of a combination of PVC and poly tubing. PVC plumbing is employed as a more permanent infrastructure. It's rigid and is almost exclusively connected with glue. Poly tubing is pliable, temporary, and can be changed and adjusted with ease. Poly tubing can be connected by a number of simple methods such as pressure fittings, threaded attachments, perma loc, and hose clamps.

## Gluing PVC



This plan requires you to glue PVC to assemble your PVC irrigation structures. Here is a tutorial on how to glue 2 PVC lines together.

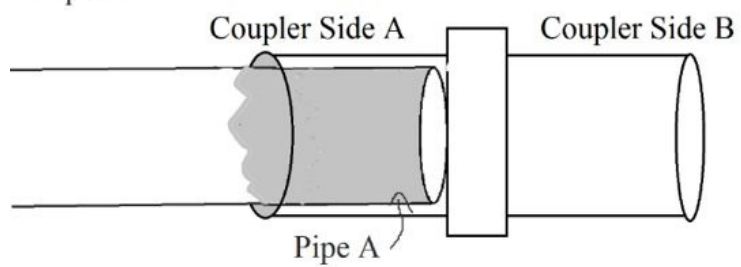
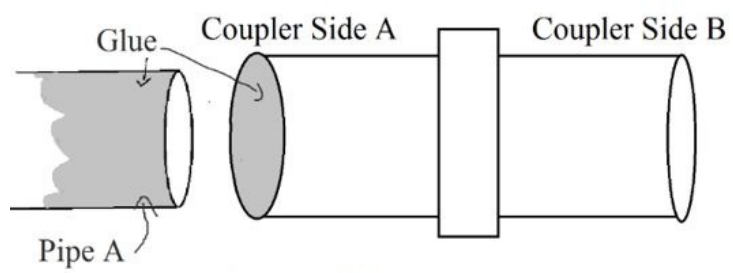


To begin, shut off all water sources to the active lines you plan on working with. Make sure all PVC surfaces to be glued are dry and clean. You will need 2 PVC 1¼ inch pipes,

Pipe A and Pipe B, and a PVC 1¼ (Side A) x 1¼ (Side B) inch coupler. Paint the PVC, Pipe A, with a primer-coated brush top. Coat the outside of the pipe evenly. Cover all of the surface of the pipe that can be enveloped by the coupler. Next, paint primer on the inside of the coupler side A. Cover the inside from the outside edge to the center of the coupler.

Paint glue with a glue-covered brush top on all of the primed surfaces of Pipe A and Coupler Side A. Cover the primer-painted areas evenly and completely. Then insert Pipe A into Coupler Side A insofar as the end of Pipe A meets the center of the coupler. Do these same steps for Coupler Side B and Pipe B.

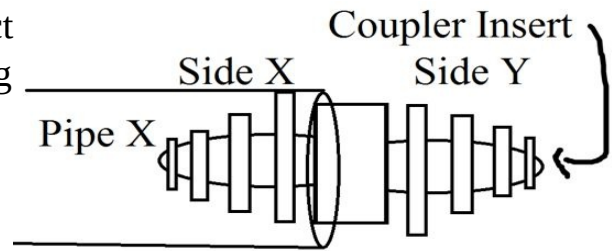
PVC glue takes up to 40 minutes to cure. Allow at least that much time before you run water through fresh-glued plumbing. Water will breach freshly glued fittings if the line is run prematurely.



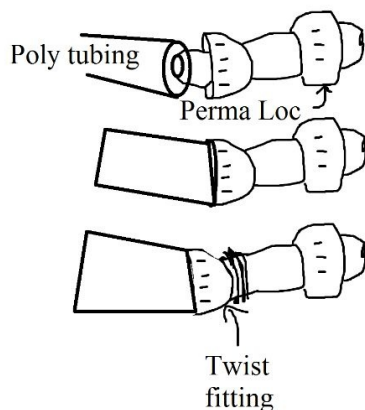
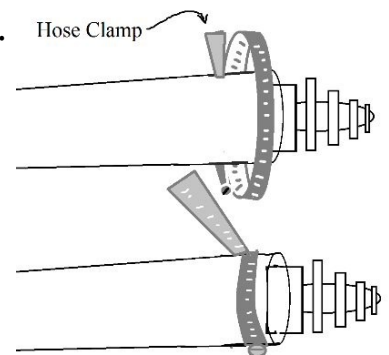
## Polytubing Plumbing

Now that you have a basic outline to connect PVC plumbing here is a tutorial for assembling poly tubing plumbing.

The preferred method of joining 1 inch in diameter poly tubing or greater is with a poly tubing coupler insert and a stainless steel hose clamp. There is no glue involved with the poly tubing. In order to attach two 1 inch polytubing lines you need two 1 inch or greater hose clamps, two 1 inch poly tubing pipes, Pipe X and Pipe Y, and a 1x1 inch poly tubing coupler insert (has side X and side Y).

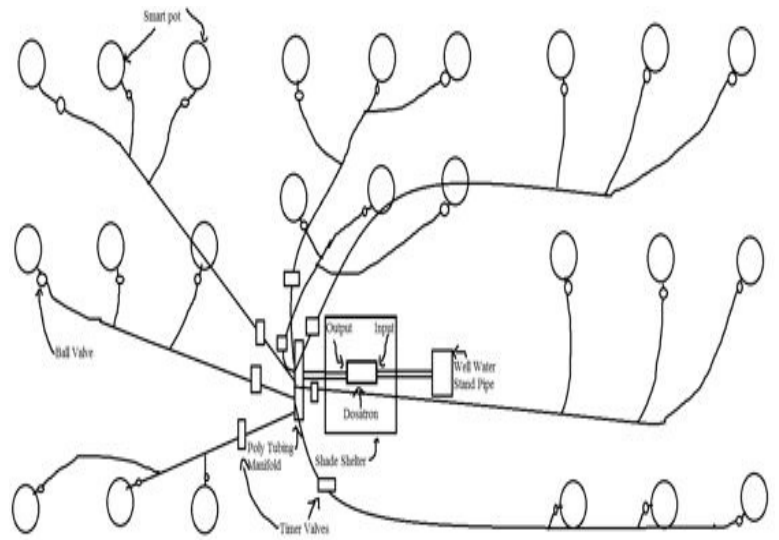


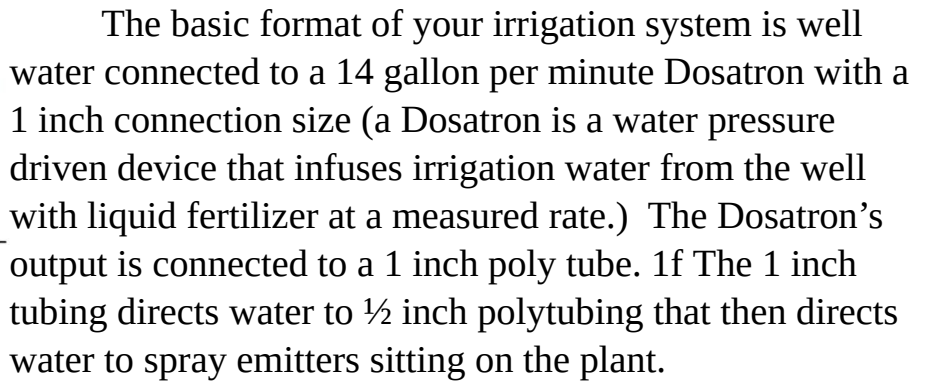
To begin envelope poly tubing Coupler Side X with Pipe X. Press the pipe to the center of the coupler insert. Slip your hose clamp over the base of poly tubing Pipe X and coupler Side X's connection point. Tighten your hose clamp with a power drill or screw driver. Then follow these steps for Pipe Y and Side Y to complete the connection.



The preferred method for attaching ½ inch poly tubing are perma loc fittings. Perma loc fittings work by incorporating a coupling's nipple with poly tubing. Once poly tubing is slipped over the perma loc nipple the fitting's compression threading is twisted to tighten over the poly tubing.

# Chapter Twelve: Irrigation Schematics

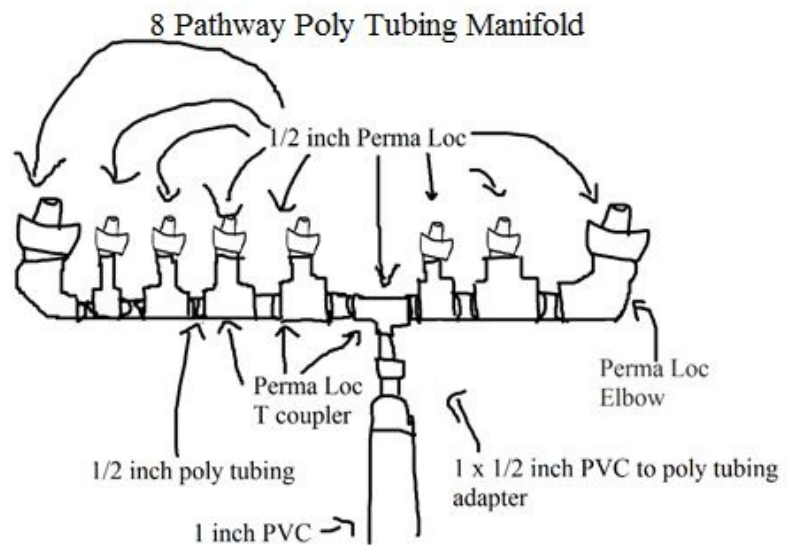




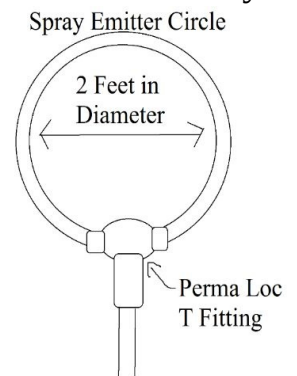
Run your 1inch poly tubing to an insert T coupler at your Dosatron. This T fitting will be used to create a bypass of your Dosatron. Both ends of the T junction have a ball valve immediately after the junction. One direction of the T fitting will connect to the Dosatron after the ball valve. The other end of the T will point downwards. The downward direction of the T is the Dosatron bypass. The bypass has a 1 inch poly tubing running along the ground that reconnects to the Dosatron's output line after a ball valve at a T junction.

The Dosatron has a fertilizer uptake tube that exits from the bottom of the appliance. The tube takes up liquid fertilizer and infuses the water of the output. The bypass allows one to run water though the system without activating the Dosatron.

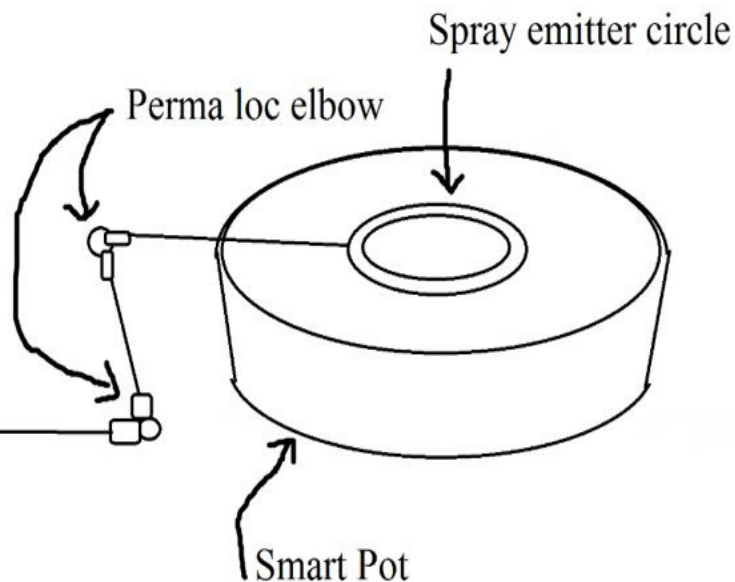
The output 1 inch poly tubing is connected to a 1 x ½ inch poly tubing manifold. The manifold adapts the 1 inch poly tubing to ½ inch poly tubing and splits the line as many times as needed. The line is split once for every 3 plants you have. With a 24 plant garden you will need an 8 split manifold. You can buy a manifold or you can make one with a 1 x ½ inch PVC to perma loc insert adapter, perma loc elbows, and T couplers.



Each pathway on your manifold will run out towards a group of 3 plants. Install a timer valve such as Claber in line battery powered water timer on each line 2-3 feet away from the valve manifold. Mount your timer on rebar or a wooden stake driven into the ground. After the timer each irrigation line splits 3 times via 2 T perma loc's and one elbow perma loc ½ inch poly tubing fitting. The 3 separations connect to a ball valve and make the final connection to the spray emitter system.



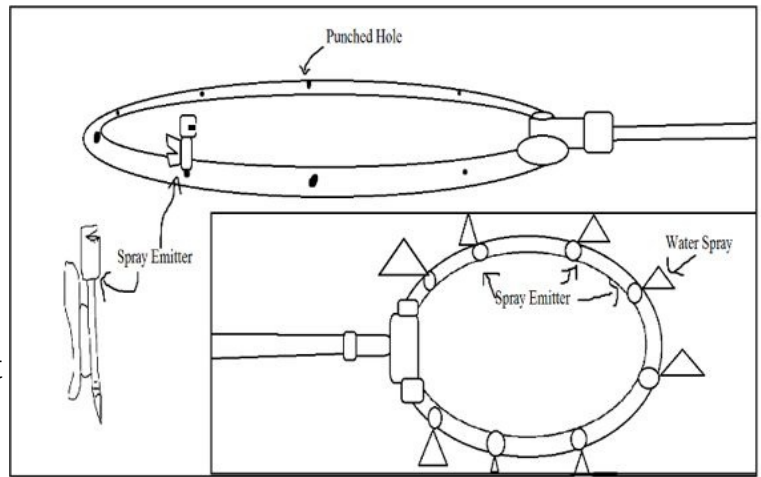
The spray emitter system starts with 2 elbow perma loc's that form a step formation with the poly tubing to place the spray emitter circle on the plant. One elbow points upwards at the base of the smart pot. The second elbow points horizontal with the top of the smart pot.



A T perma loc fitting that connects into the line at the base of the T and circles back into itself at the top of the T. The poly tubing circle is 2 feet in diameter and is positioned in the center of the smart pot. The poly tubing will later encircle the trunk of the plant.



Install spray emitters in the poly tubing. Use a ½ inch poly tubing hole punch tool to punch 8 equally distanced holes in the circle. The holes should all face upwards when the circle lays flat on the smart pot. Then insert a 0-25 gallon per minute adjustable 90° fan spray emitter in each hole. It's important to get 90° emitter to allow all of the water to spray away from the trunk of the plant.



### Irrigation Test

When your irrigation is all closed, glue is cured, and it's all assembled it's important to test the line. Check the plumbing assemblages in the order the water flows.

Check your stand pipe's fittings to ensure they are not leaking water. If PVC fittings fail you must take them apart. Use a new fitting and cut piping to use untarnished PVC in your new fitting. Tighten the hose clamps if your 1 inch poly tubing connections leak. Then if your perma loc fittings leak tighten those as well.

Test your Dosatron with the bypass on and off. Do not run your Dosatron without a liquid for it to infuse with. For the test you can place the Dosatron's uptake tube in a bucket or barrel of water. Again, tighten any leaking connections.

At the polytubing manifold adjust for any leaks. Run water through every line individually by opening one of your manifold's pathway's electronic valves at a time. Then test that pathway for leaks. The spray emitter circle should rest in the center of the smart pot. The emitters should be oriented to evenly wet all of the soil to the edge of the smart pot but not past the smart pot or into the soil inside of your circle. Use the dial on the emitter to adjust their pressure to your desired spray.

If you have low pressure on any or one of your spray emitters with their dials all the way open there are a few potential issues. First check the individual emitters. Take the top off the emitter and open the dial all the way. Use a thin gauged wire or pipe cleaner to clean inside the top and the emitter. Be wary of any stray bits of perlite or soil, they are the usual clogging culprits. Next ensure you have only one pathway from your manifold open. Finally search and mend/correct any possible leaks.

# Chapter Thirteen: Green House Stage Conclusion

You will have to juggle your time between prepping your outdoor garden and maintaining a beneficial greenhouse environment, watering, pruning, and supporting your plants. Start preparing your outdoor garden space earlier in the year if you are the sole gardener and you are growing over 24 plants.

Weeks will pass through May and June and your outdoor garden will begin to take shape. Your fence will keep out intrusive wildlife. The smart pots will be full of soil and ready to host your plants. T posts will be up and ready support your plants. The irrigation system will be ready to give your plants their water and liquid nutrients. During the first week in June you may have to increase the amount of fans in the greenhouse. The plants might need to be moved into pathways and away from walls if they begin to push the boundaries of their greenhouse ceiling and walls. The decision to move your plants outdoors may be pushed early if your plants grow too large or the weather gets too hot too soon.

# Stage Three: Outdoors

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# Chapter Fourteen: Outdoors

Around June 21<sup>st</sup> it's time to have your plants out of the greenhouse and in their outdoor pots. Your time during the summer stage of your outdoor growth is mostly occupied by caring for your plants. Pruning and trellising becomes more of an endeavor as you begin reaching upwards of 10 feet off the ground. Also during this stage, dialing in your irrigation and adapting as your garden and weather changes is a vital part of growing healthy plants efficiently and as large as possible.

## Moving Your Plants One Final Time

Plan to have your last plant in the ground by June 21<sup>st</sup>. It takes 2 people 2 hours to transplant each plant. Always transplant in the morning, only transplant in the afternoon if absolutely necessary. Avoid transplanting during medium to heavy winds. Now let's go through the greenhouse to outdoor transplanting procedure.

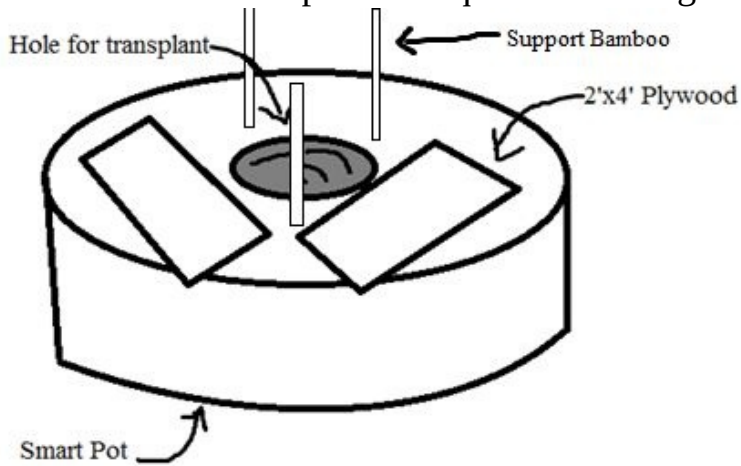
First look at your garden and plan where each of your plants will go. The plants cast their shadow towards the west in the morning, they cast their shadow towards the east in the afternoon, they cast their shadow to the north to some degree all day, and they never cast a shadow towards the south. So if you know you have a variety that tends to grow tall and skinny, such as Pineapple, position all of your pineapple on the north side of the garden. This way your tallest plants won't shade out other smaller plants. If you have no known varietal size inclinations you can orient your plants from their size at transplant, biggest to smallest, north to south. Draw a map of where each of your plant's varieties are positioned. This map is a helpful backup to identify varieties if you lose your plants' tags.

24 hours prior to transplanting create 4 gallons of rooting solution for each plant you plan on transplanting. Dissolve one teaspoon of Age Old water soluble mycorrhizae for every gallon of solution. Then immediately prior to transplanting dissolve and mix one teaspoon of Actinovate per gallon of solution. When you mix your solution for a day of transplanting make it in a 55 gallon barrel with a double layer of shade cloth draped over the top. Position your barrel in a location centered amongst all the pots you plan on transplanting into.

Dig a hole in the exact center of one of your 600 gallon smart pots that is the same depth and twice the width of your 45 gallon smart pot. Turn your irrigation system on and only open the valves that will permit it to spray the pot you're working on. Allow your spray emitters to soak the pot for 15 minutes. Turn off the water line and remove your spray emitter circle from the pot. Apply about 2 gallons of rooting solution to your hole with your sump pump from your 55 gallon barrel.

Bury three 6 foot shoots of bamboo within 6 inches of the edge of your hole. Orient

the bamboo to the shape of an equilateral triangle. Each shoot is buried at least 2 feet deep



in the soil. Afterwards place two 2x4 foot boards of plywood at the borders of your hole. You can use these boards to stand or lean on when you are transplanting. Don't step or lean on your soil without a platform to diffuse your weight. It's difficult for roots to grow in compacted soil.

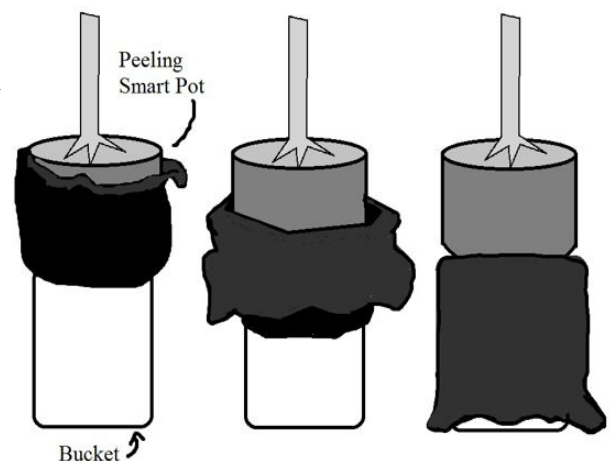
Allow your plants to dry out before you begin moving them.

Recently watered plants are much

heavier and harder to transplant. Position your wheelbarrow beside the plant you intend on moving. Wrap that plant with green plant tape ties in the same manner as when you moved your plants from the grow room. You won't be able to bundle the plants up as tightly as before because they are much more rigid and woody than they were during their last move.

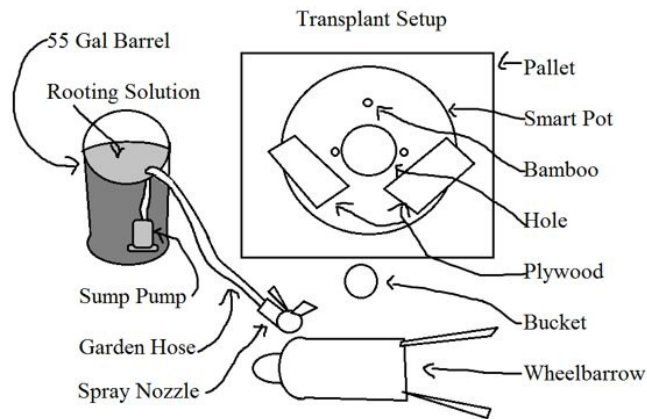
After your plant is wrapped and secured, cut any strings that may bind the plant to the greenhouse. It's best if you have a helper for moving the plants to their outdoor pots, because the plants are now a heavy and unbalanced weight. Grab the smart pot slack and place the plant squarely in the wheelbarrow. Carefully wheel your plant beside the 600 gallon pot that's primed for transplanting.

Grab a 5 Gallon bucket and set it upside down beside your wheelbarrow and on the ground diagonal from the space between your two plywood boards. Place the 45 gallon smart pot and plant on the top of the 5 gallon bucket. Identify the thickest and tallest growth on the plant and spin the plant on the bucket such that the fullest part of the plant faces south and/or the sparsest part of the plant faces north. Peel the edges of the smart pot downwards. Circle around the pot and slowly peel the pot all the way down on each side.



Lift and position the plant into the 600 gallon with 2 people (Gardener A and Gardener B.) Have Gardener A place their knee on the plywood to the right of the hole, Gardener A then places their opposite foot on the ground, and Gardener B places the bucket and plant within arm's reach of Gardener A. Gardener B stands over the plant and bucket. Gardener B lifts the plant, while stepping on the top of the bucket and the 45 gallon smart pot with one foot, and moves around the bucket to the left. Stepping on the 45 gallon smart pot separates the plant from the pot. Gardener A is lifting the plant and pulling it towards themselves and the hole while Gardener B lifts the plant off the bucket.

Gardner B kneels on the plywood on the left of the hole as they get closer to the smart pot. The 2 gardeners lean in and gently place the plant in the hole.



Gardener A holds on to the stalk of the plant to keep it steady. Gardener B observes the plant to ensure it is standing straight up and down. The soil of the transplant should be level with the soil of the 600 gallon smart pot. Gardener B can build up the bottom of the hole or dig deeper to balance and level the plant. Gardener A can readjust the plant slightly by

moving the trunk of the plant. Gardener B begins to bury the transplant once the plant is in a satisfactory orientation.

Gardener B uses polyethylene baling twine to secure the plant's trunk to the new bamboo supports in the 600 gallon smart pot while Gardener A holds on to the stalk of the plant. The baling twine is wrapped once halfway around the trunk and is tied to the bamboo support with an overhand knot followed by a slipknot.

Once all of the new bamboo supports are tied, Gardener B disassembles all of the bamboo support that was on the plant before it was transplanted. Leave all of your plant tape tied to your plant bound. Gardener A then slowly releases the plant and observes if the plant stands upright on its own. If the plant can't stand up on its own Gardener A quickly grabs the stalk and stabilizes the plant once again. Gardener B can add more bamboo shoots to the soil and secure them to the plant until the plant is supported.

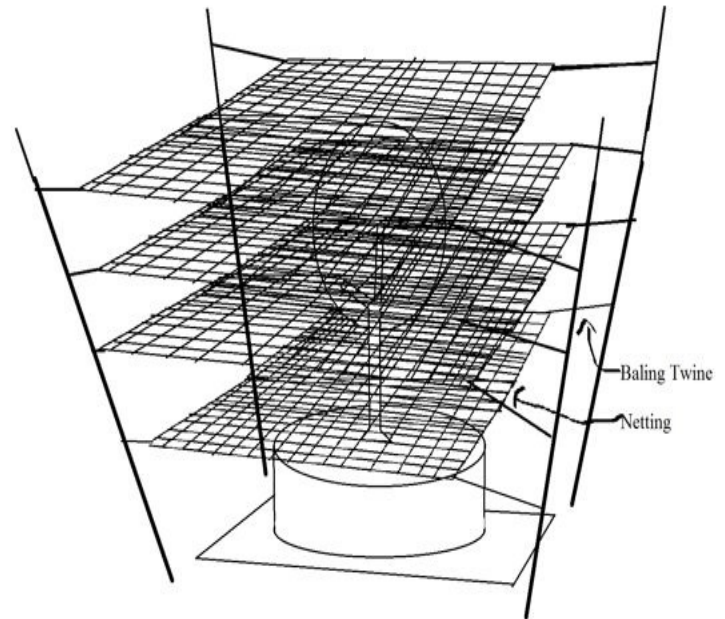
Now the transplant is hand watered in with well water until near saturation. Apply the 2 gallons of allotted rooting formula on the soil that was in the 45 gallon pot and the 6 inches of surrounding soil. Open one end of the spray emitter circle and enclose the circle around the trunk of the plant.

Once the plant is watered in you can begin trellising your plant. The trellising system uses a 6 foot wide trellising net that comes on a 300 foot roll. The squares on your trellis netting should be ~6x6 inches.

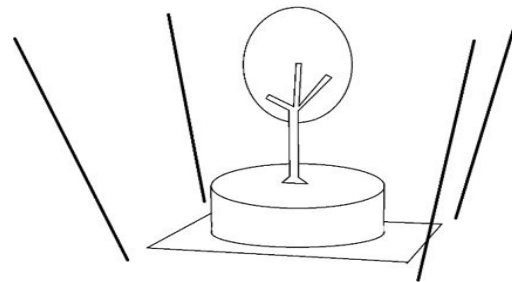
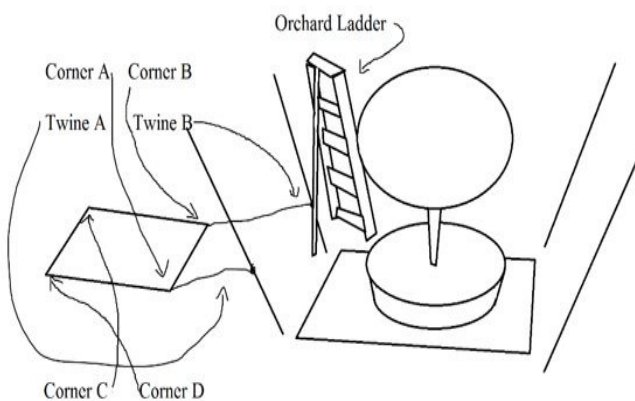
The trellising system is a layering of vertical horizontal trellising that begins at 4 feet up the T post from the ground. The 4 corners of the layers are tied to their corresponding T posts. The layers of trellising are scheduled every foot and a half up to 12 feet off the ground.

# Chapter Fifteen: Trellising

Begin trellising your newly transplanted plant before you transplant any other plants. Their bamboo support system is only temporary and won't support your plant if a heavy gust of wind comes through. Unroll about 10 feet of trellising and count out 16 squares. Make a cut on the 17<sup>th</sup> square so that the 16<sup>th</sup> and last square has all 4 borders. This will leave you with a 6x8 foot rectangle of trellising. Bring the trellising over to your plant and set it to the side.



Cut four 8 foot lengths of baling



twine. Tie a length of baling twine to each of your T posts. The height of where you tie your baling twine should be about 4 feet up the T post. Tie your knot by wrapping the twine around the post twice, then tie an overhand knot, then tie a slipknot.

Tie the end of your Twine A to Corner A of your trellising. Whenever you tie baling twine to the corner of a trellising layer tie with a single slipknot. Single slipknots allow for easy adjustments. Next tie Twine B, next to Twine A, to Corner B. Place an orchard ladder on the side of the plant where your trellising is with the leg of the ladder placed between the pallet and the T post.

Next grasp a 6-8 foot length of bamboo and climb up your ladder. While on the ladder slip the end of your bamboo into Corner C. Move the bamboo and trellising together in an arc to bring the trellising up and over the plant.

Tie Corner C to Twine C and Corner D to Twine D, but leave the trellising loose for now. Move your branches through the trellising to bring the trellising down the plant to be



level with the ties on your T posts. Find the center of your plant and bunch the branches to a bundle and sift the branches through the center square of your trellising. One person can bunch the branches and the other can bring the trellising down around the bunch.

For your first layer of trellising you will bunch a large part of the plant through the center square of your trellising. With each successive layer of trellising you will need to bundle the branches less to fit them through the trellising. If you are finding it too difficult to slip all of the branches through the center you can cut the lines of the center square to make a larger opening. Then once the trellising is level with the corners and ties you can zip tie the center back together.

When your trellising is level with their ties you can tighten up the ties. Untie each of your corners and retie them slightly tighter. Move around and tighten each corner until the trellising is tight across the plant. Readjust the nearby branches so that the branches rest on the trellising. Don't allow your trellising to push branches downward.

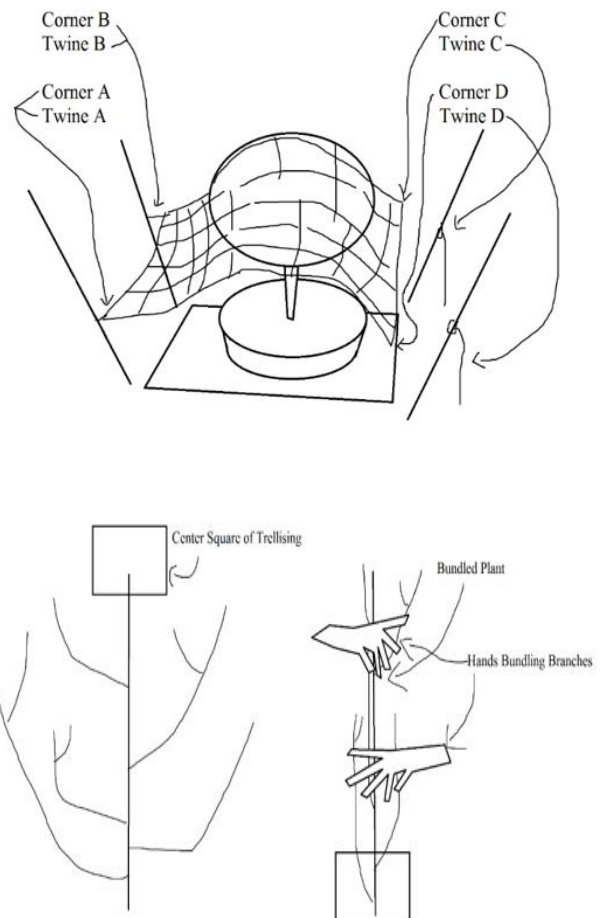
When you are positioning your branches in the trellising you will be able to choose if the trellising will point the branch straight up, lay it horizontal, and everything in between. Allow your plants to grow in their natural positions if they are too woody to move and avoid doing either extreme for your branch positions.

Your first layer of trellising is complete when all of your branches are positioned and the netting is tight and horizontal.

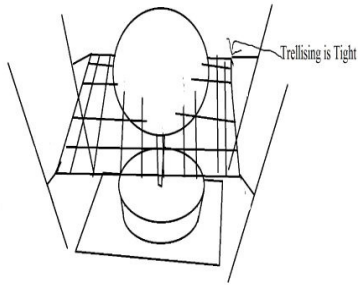
As you trellis your plants you will notice they are showing signs of stress. Their leaves are drooping and the plant is in shock. It may take 24-48 hours for the plants to recover from transplanting. However you should be as gentle as possible during trellising. You want to avoid snapping any branches (if you do make a clean cut with scissors and paint the wound with Doc Farwell's tree seal.)

After your first layer of trellising begin your next layer of trellising by tying 4 lengths of baling twine 1.5-2 feet higher than your first layer on the T posts. Move through the same steps as your first layer of trellising. Continue to layer trellising until you have a layer that sits right at the top or right above the top of your plant. If your plant is 6 feet tall you should have around 3 layers of trellising.

Once you have all of your layers tight and your branches oriented you need to



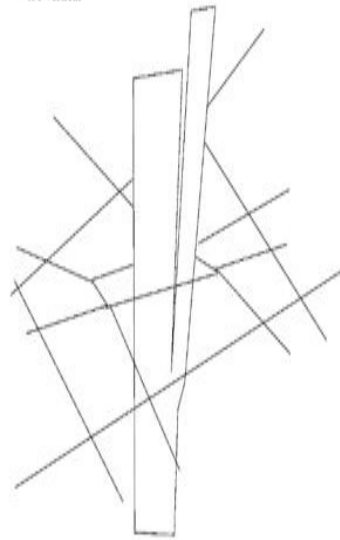




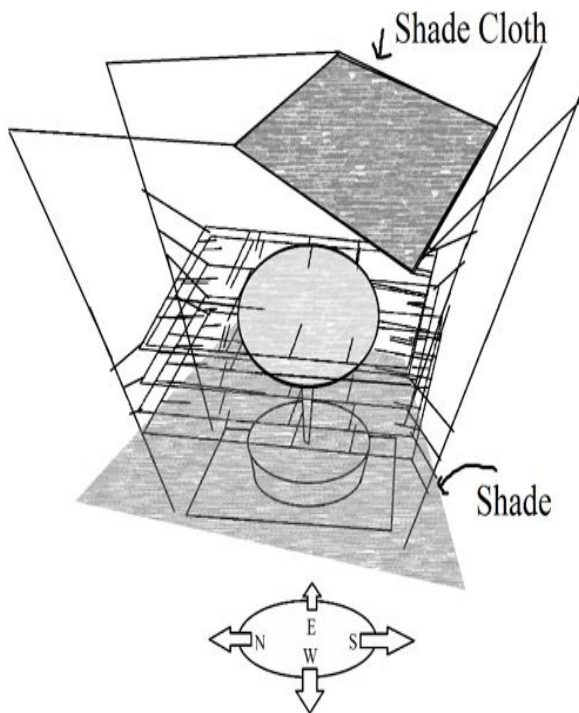
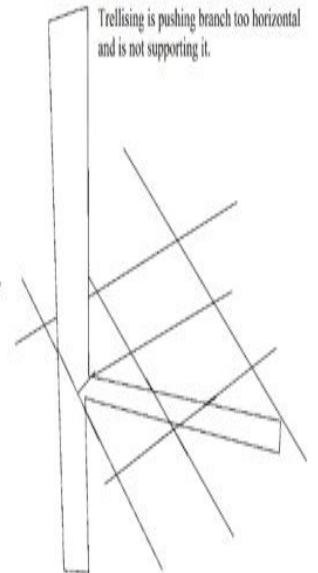
protect your plant from sun. The plant has never experienced direct sunlight before and it needs a chance to adjust. If a plant is too abruptly exposed

to the harsh afternoon sun it can react negatively.

Trellising is pushing branch too vertical

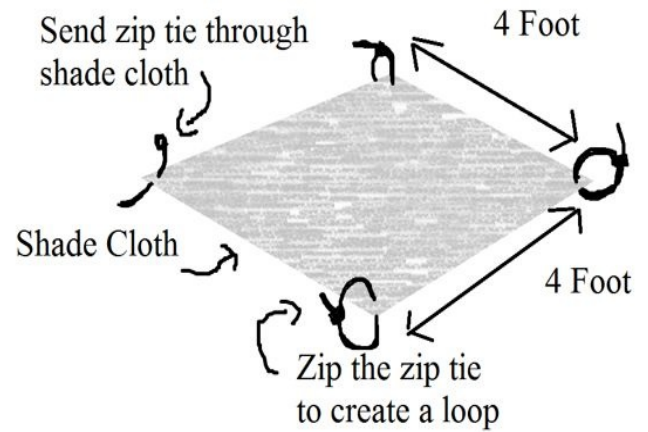


Trellising is pushing branch too horizontal and is not supporting it.



Hang shade cloths from the tops of your T posts to protect your plants. Purchase a 12 foot wide and 36 foot roll of shade cloth for every 24 plants you intend to grow. Cut out 12 6x6 foot sheets of shade cloth. These sheets stay over the plant for 4 days. After the 4 days you can take the shade cloth down and put it over the newly transplanted plants. However If you can transplant more than 12 plants in 4 days you will need more shade cloth.

On each corner of your shade cloth sheets loop the end of an 8 inch zip tie through the fabric and zip it to produce a loop. Climb the ladder to tie an 8 foot length of baling twine to the top of each T post. Tie your baling twine to the T post with an over hand knot followed by a slipknot. Tie the ends of those baling twine lengths to the zip tie loops on your shade cloth with a single slipknot. Use your ladder to reach and tighten the baling twine on the corners of your shade cloth. Tighten the baling twine so that the Shade cloth is held fixed in a southern facing and southern downward slanted position. This position creates the most shade protection for your plant.



When your final plant is ready and in the ground, you can take a step back and appreciate your plants' growth is now faster than ever. The large 600 gallon pots, direct sun, and summer weather will have your plants nearly growing before your eyes. Yet with every new stem and leaf that grows that's a moment's more work pruning and trellising for you.

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# Chapter Sixteen: Outdoor Irrigation

Your outdoor irrigation program will start with hand watering in conjunction your spray emitters. Hand water the soil close to the base of the plant for a week or longer. It takes time for your plants to grow outside of their old boundaries. Give a concentrated watering to your plant's root ball during their first week of transplant or they may go thirsty. After a week of hand watering keep an eye on your plants for signs of thirst and continue supplemental hand watering if they do.

Run your irrigation system for 15 minutes on each 3 plant group. Run more than 1 group at a time if you have enough water pressure. Program your electronic valve timers to open one after the other at some time in the morning (always water in the morning.) Aim to water for 4 days on and 1 day off. Infuse liquid nutrients with your Dosatron 3 of your 4 watering days. You can program the day off in your timers or shut off the main water valve on that day. High temperatures or rain storms may change how often you water.

Each time you water inspect the emitters on all of your plants. The sprayers should be directed away from the plant and the trunk is remaining dry. Then the emitters should be spraying evenly in a fan shape to the edge of the pot. Adjust pressure and direction of the erroneous emitters to ensure even coverage of the soil. Disassemble and clean with a pipe cleaner any low pressure or sputtering emitters.

To setup your Dosatron you will need a total dissolved solids (TDS) meter. A TDS meter tells you how many parts per million (PPM) your dissolved fertilizer solids are in your water. When you were mixing your liquid nutrients yourself it wasn't important to measure TDS.

Set your Dosatron to 20 ml/gallon (Pro Grow [15] and Liquid Karma [5]) by turning the dial to .5%. Place your Dosatron uptake in a bucket or barrel of a solution of 3 parts Pro Grow and 1 part Liquid Karma. Turn on your irrigation system, and collect enough infused liquid from your emitters to submerge your TDS meter test strip. Turn off the irrigation system and record your TDS. Your TDS should be in the 800-1000 TDS range.

Test your TDS weekly and slowly raise your TDS throughout the year. In the summer up the TDS with Pro Grow by upping your ratio of Pro Grow to Liquid Karma ratio in your uptake solution and opening your Dosatron dosage dial. In the fall you will do the same, but up the TDS with Botanicare Bloom liquid formula. Always keep your Liquid Karma ratio to the water the same 5 ml/gallon or .125%.

## Your TDS follows this schedule:

June 800-1000

July 1000-1400

August 1400-1600

September 1700-1900

October 1900-2200

## Irrigation Notes

Throughout the summer growing season (June 21<sup>st</sup>-August 8<sup>th</sup>) your irrigation routine will remain largely unchanged. However there are some occasional switch ups in your routine.

## Adjusting Water Levels

You may find the prescribed 15 minutes of water 4 days on 1 day off are too much water. Remember from the troubleshooting chart that a dry plant is wilting, it has dry leaves and dry soil, and over watered plants droop with leathery leaves and wet soil. Overall you will have to adjust your watering parameters with at least a monthly frequency.

Dial back the amount of days you water for if your plants are showing signs of over watering. If you over water allow at least 48 hours to dry out your soil. Then start watering again at 7 minutes for the first day back on. Then water 3 days on 1 day off. Understand that your plants watering needs are very largely dictated by the temperature outside. The hotter it gets the more they drink. Take the day's high temperature into account when making watering decisions.

Prevent over watering by observing the weather and forecast and be proactive about the changes the weather brings. If it's high of 90°F for 5 days straight and you have 2 days in the low 70's take one or both of those days off from watering. If there was a 12 hour rainstorm the night before you are scheduled to water, turn the water off that day.

It's unlikely you could under water with the prescribed irrigation routine. If you are experiencing thirsty plants start watering 5 days on 1 day off.

## Scheduled Flushes

On the second week in July and the first week in August flush your plant's soil to clear it of excess salts. Flush on a planned no liquid nutrient day. Set 2-3 gallons in your Dosatron uptake vessel. Set your Dosatron to .5% and water for your regular length of 15 minutes. Salt flushes help cure and prevent nutrient lockout. Nutrient lockout occurs when there is so much salt in the root zone osmotic pressure pulls water away from the roots.

# Chapter Seventeen: Compost Tea

Compost tea is a molasses and water based solution that is rich in beneficial microbial life forms. Compost tea is created by super aerating sugar dense water with a fungal inoculant and supplemental nutrients. The tea is brewed on site for 24 hours and then applied to the plants' leaves and soil via sump pump and garden hose. Compost tea has subtle yet far reaching results in your garden.

In one way compost tea is a good preventative measure against disease and fungal pathogens. When the beneficial microbial populations in the compost tea are applied to a plant they occupy all of the space and that malicious microbial populations would attempt to colonize when left vacant.

Compost tea also provides plants with a steady stream of supplemental sugars. These sugars are useful to the plant for making new vegetative buds and for creating heavier flowering buds. In addition to that compost tea boosts nutrient fixing (fixing means makes otherwise unusable nutrients usable) fungi by adding to the population and assisting its growth.

Apply compost tea on a weekly basis through the summer during the vegetative growth stage. Always apply compost tea on a no spray day on your spray routine.

The equipment you need to make 100 gallons of compost tea starts with a vessel that contains 120-150 gallons. The vessel is proportioned such that it is wider than it is tall. The high surface area makes it easier to aerate your compost tea. Then purchase:

- 2 Active Air 110 liter per minute air pumps
- 2 twelve outlet air tube manifolds
- 8 painter 24 one to two inch bubble stones
- 8 compost tea bags
- 40 feet of 3/8 inch inside diameter tubing.

The ingredients for making 100 gallons of compost tea calls for ~1.25 gallons of dry material in 4 tea bags:

- 10 cups of compost
- 2 cups of Bokashi inoculated dry material
- 2 cups of alfalfa meal
- 6 cups of worm castings

1 tbsp of oats

Add these ingredients to be suspended in 100 gallons of water you are brewing with:

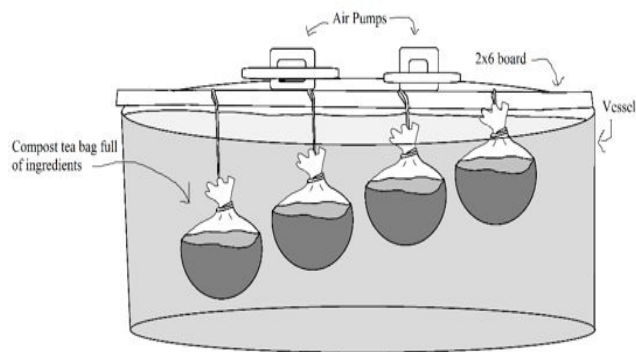
8 cups of molasses

1/3 cup of powdered whey

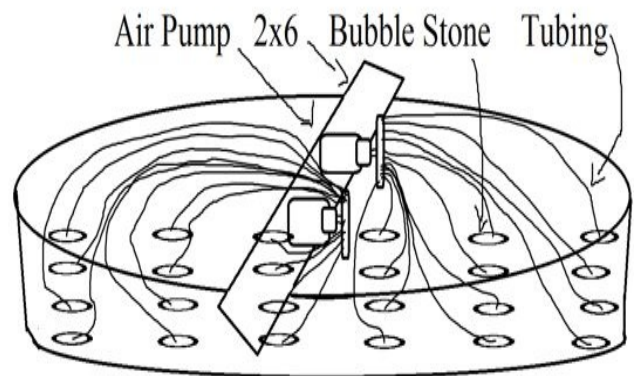
6 teaspoon of Azomite

Begin brewing by setting up your brew rig under your shade shelter. Shield your compost tea from any direct sunlight. Direct sunlight devastates your microbial populations.

Fill the vessel with 100 gallons of water. Add your ingredients to be suspended in water. Place your sump pump in the water and leave the output hose in the water to circulate the solution. Mix the water with a shovel and then allow your sump pump to mix for 15 minutes.



Place a 2x6 board across the center of your vessel. Mount your air pumps to the 2x6 by screwing their feet into the board. Connect your



pumps to their manifolds and cut 24 lengths of tubing. Create every length long enough to reach the furthest ends of the vessel from the air pumps. Attach a bubble stone to the end of each tube. Position the stones to be evenly distributed across the bottom of the vessel.

Place your dry ingredients in equal measure in 4 compost tea bags. Tie the bags to the 2x6 with baling twine equidistant to one another. The bags are at staggered depths with none touching the bottom or hanging above the water.

Turn the air pumps on and brew for 24 hours. Start your brew in the morning and only apply compost tea in the morning after the plants have been irrigated. Apply the compost tea through a sump pump submerged in the tea. Attach a garden hose with a spray nozzle to the pump. Spray each plant with an equal amount of tea. Spray the leaves and the soil with equal amounts.





# Chapter Eighteen: Outdoor Daily Routine

## Spray

Now your plants are larger, the electric atomizer is no longer the tool for the job. For outdoor spraying you need a mobile paint sprayer setup. Purchase a Graco Magnum XR7 paint sprayer and a 5 gallon bucket. Mix your spray formulas in a 5 gallon bucket and place it under the paint sprayer's uptake. With the paint sprayer you can now reach the tops of the tallest plants and mix much larger batches of spray formulas. The paint sprayer isn't ideal for indoor or greenhouse use because the plants are more fragile and require much less spray.

The outdoor spray routine is very similar to your previous spray routines with a few changes. There are some additional sprays and some sprays are omitted. The outdoor spray routine is as follows:

Spray Day 1 Formula: (applied via paint sprayer) 3 teaspoon Actinovate, 3 ounce Organicide, 2 teaspoon Doctor Bronner's liquid soap, 2 teaspoon Liquid Karma, 2 teaspoon Nitrozyme and 3 Gallons of water

No Spray 3 Days

Spray Day 5: (applied paint sprayer) 3 teaspoon Plant Doctor, 4 teaspoon Companion, 2 teaspoon Liquid Karma, 3 tbsp. of CalCarb and 3 Gallons of water.

No Spray 2 Days

Spray Day 8: Repeat Cycle

## Pruning

Pruning your plants in the outdoor stage is a vital part of growing 10 pound plants. Every redundant and useless bit of growth you cut, you redirect energy to the productive parts of the plant. Still, pruning without a plan is not enough. Choosing the correct times to prune throughout the season makes all of the difference.

Always prune before noon. Wait to prune your plants after they are first transplanted. The transplanting process stresses your plants enough. You don't want to stunt your plants by adding insult to injury. Wait at least 2 weeks before you prune the first time outdoors. Furthermore your plants are focusing their energy on root growth at this stage.

Pruning your outdoor plants takes larger orchard ladders and more man hours with

every bit of vegetative growth. Yet the basic principles of pruning remain the same. You will have to purchase some taller orchard ladders and learn a few tricks for reaching your plants' more hard to reach pruning areas.

The top center growth just below the canopy of every large plant is the most difficult to prune. One way to prune this area is to climb inside of the plant and the trellising and stand on a piece of plywood. You can cut an access route through the trellising, minding to not cut the borders, and zip tie the route back together once the hard to reach place is pruned.

Use your long reach pruners to assist in cutting those hard to reach stems and leaves. Get more reach out of your orchard ladders by placing the ladders legs astride the smart pot. Pull branches down gently and prune what is needed (if the branch is bendable.)

### Trellising

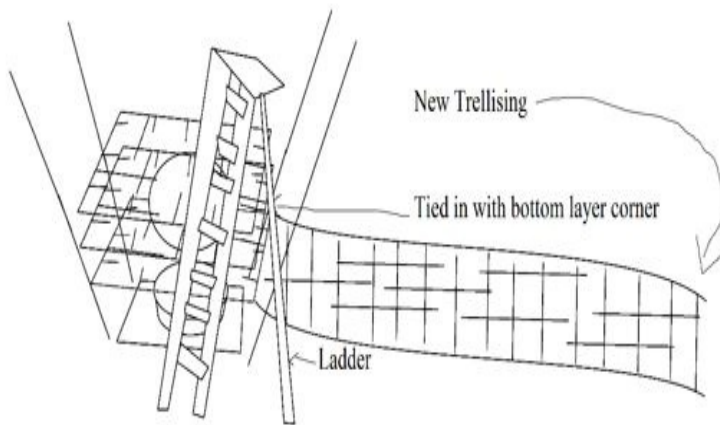
Your plants will require more trellising and support as they grow outdoors. Continue to make horizontal layers of trellising as your plant needs it. This means whenever your plant is growing past its most recent layer it's time to tie a new layer up. You can also preemptively tie layers of horizontal layering all the way up the T post.

You will need to extend your T posts' height before your plant's height surpasses it. Purchase one 10 foot bamboo pole for each T-post and three 2 inch hose clamps for each T post.

Place the bottom of the bamboo 6 feet up the T post, or at the last 2 feet of the T post, and hose clamp the bamboo 3 times to the T post. Place the hose clamps equally distanced from one another. Tie the tops of the new bamboo extensions to each other in a tension support network in the same fashion the tops of the T posts are tied to each other.

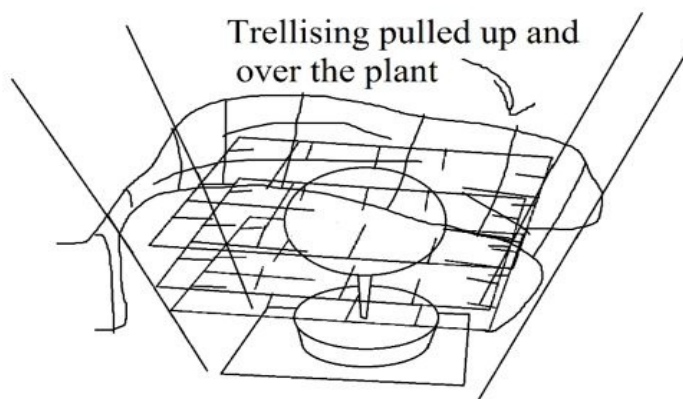
# Chapter Nineteen: Vertical Trellising

Vertical trellising becomes most necessary when your plants' widths are larger than their horizontal layers can support. Wait until the right moment to decide to trellis vertically. Vertical trellising put up too early will prevent you from getting access to inner parts of the plant that need pruning.



Tie up vertical trellising around August. You will know your plants need vertical support when their lateral growth obviously exceeds the borders of the horizontal trellising. Vertical trellising is needed around the time the highest layer of horizontal trellising is tied on the T post. Also you may know it's time to tie up vertical trellising when all of your pruning is done near or past the borders of your horizontal layers.

Begin vertical trellising by cutting a long strip of trellising around 36-42 squares long. Tie the 2 corners on the narrow side of the new strip of trellising in on the bottom layer of trellising's corners.



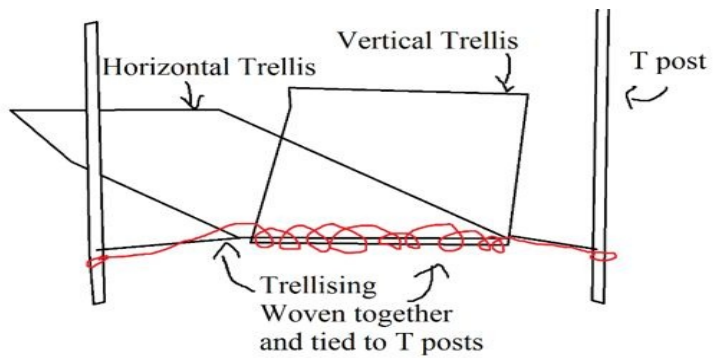
Place your ladder on the opposite side of one of the T posts the new trellising is tied to. Use a 6-8 foot bamboo pole to slip into the farthest square from the tied squares and pull the trellising up and over the plant. The opposite end of the trellising lands on the opposite side of the plant it was tied to.

Tie the top of the trellising's corners to the 4 T posts in the same fashion as a horizontal layer. This horizontal partition of the new trellising should be 1.5 feet above the last layer of horizontal trellising.

The corners are tied such that the top horizontal face and the vertical bottom tied face of the trellising are tight. Go back to where the vertical trellising is tied into the bottom layer of horizontal. Weave a string of baling twine between the nettings' squares to effectively bind them together. Tie the weaving string to the 2 T posts at the same locations the bottom layer of horizontal is tied.

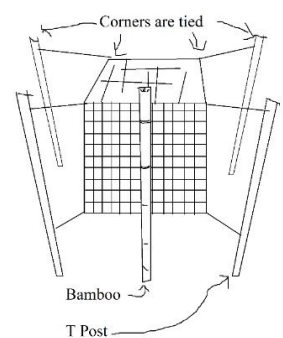
Tie the loose end of the trellising's corners in to the bottom layer of horizontal

trellising's corners. Select a square of the loose trellising to tie in that will leave the trellising tight. It may be the last square, it may be 3 squares back or you may need more trellising. If you need more trellising cut the appropriate length and weave it to the end of your trellising in the same manner as seen above.

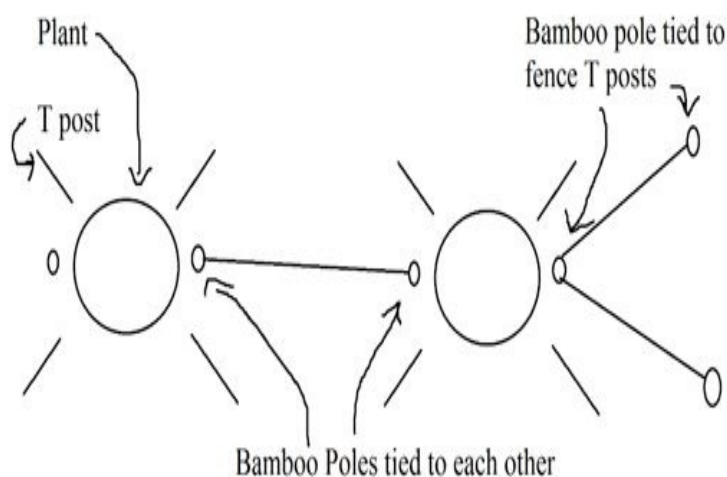


Insert a bamboo pole into the new tight vertical face. Then zip tie the two bamboo poles to the trellising they are slipped into. Use one zip tie near the top of the bamboo and one zip tie 2 feet below the first.

Tie the tops of the bamboo with baling twine to something straight out from it. The baling twine should apply tension and pull the bamboo and the vertical trellising out. Tie the bamboo to another plant's vertical trellis bamboo or if there isn't another plant across from it tie it to the fence T posts.



Once you have vertical trellising on these 2 opposing sides of the plant repeat the process with the other two opposing sides of the plant. The bamboo support poles are tied on the top horizontal facet of vertical trellising as well.



As your plants grow beyond the top layer of your vertical trellising you will need to add more horizontal layers of trellising. Every horizontal layer of trellising you add to your plants past the T post layer and on to the bamboo poles are cut 16 squares long. The longer sheets of trellising will help support the widening edges of the plant.

If your plant's width is creating support issues on the sides of your plant you can create another layer of vertical trellising.

# Chapter Twenty: Outdoor Grow Overview

During your outdoor vegetative grow session your plants grow to their largest. They will grow vegetatively all the way up to the first week in August.

It's important to work on your garden daily to see its full potential. Your daily outdoor garden work begins with watering. Assess the moisture levels and water needs of your plants before you water. Remember to progressively increase your grow formula ratios throughout the vegetative growing season.

During irrigation sessions inspect your emitters. Look for clogged sprayers and fix them with a pipe cleaner. Check and adjust pressure on the emitters such that they spray with as much pressure without spraying over the smart pot. Check and adjust the orientation of the emitters. Position their spray fan so they don't spray the trunk and they spray the soil evenly.

Maintain your spray and compost tea regime. Ensure you cover every leaf on the plant with each spray and tea application. Use your ladder to reach the tops of the tallest plants. Remember on a good spray application there is a reflective sheen of moisture on the leaves from top to bottom of the plant. You know you have applied a sufficient and even spray when the leaves are dripping.

Observe your plants daily for growth rates. Plan for when you will need to prune and have helpers ready when the time comes. When you prune you want to try to prune the entire garden in a week. Avoid finishing the last plant in a prune cycle and realize you have to start a new cycle the next day. If you spend every day of the summer pruning there will be very little time to trellis and spray. Coordinate your pruning sessions to have a cycle of pruning completed on or by August 8<sup>th</sup>.

Keep an eye on your plants' support needs. You may find some branches need to be tied up with plant tape or baling twine. Tie the unsupported limb to the next highest layer of trellising or to a well-supported higher up limb.

Look for broken branches. Identify why the branch broke and explore ways to prevent that occurrence. If the branch is more than 50% attached to the plant you can tie it up with plant tape to hold its former position. If the branch is completely or mostly detached make a clean flat cut across the break. Paint Doc Farwell's plant glue on repaired limbs' wounds and on branch cut locations. The glue keeps out moisture and protects the plant from pathogens.

Trellis horizontally before your plants need it. Look for loose trellising and tighten them up at their slipknot ties. Also examine your tension lines that connect the T posts and bamboo. Keep all of your baling twine lines tight. When you place tension on baling twine don't apply so much you leave slack in another area. Apply just enough tension so the line has no slack.



# Stage Four: Transition and Harvest



# Chapter Twenty-one: Transitioning

On August 8<sup>th</sup> begin transitioning your plants' liquid feed from Botanicare Pro Grow to Botanicare bloom. The plants are beginning to direct all of their energy to growing flowers and your liquid feed will reflect this switch.

Use your TDS meter to test your water. You should be irrigating at 1400-1600 TDS. Mix half Botanicare Bloom and half Age Old Grow (Age Old Grow has high Nitrogen and can provide your plants with one last blast of vegetative nutrients) and your usual portion of Liquid Karma in your Dosatron uptake vessel. Use this half and half transition formula for 3 waterings. After the 3<sup>rd</sup> watering of transition use only bloom and Liquid Karma in your Dosatron.

## Spray Routine

When the plants begin growing flowers they become more sensitive to the sprays you use. For instance some harsher sprays will burn the trichomes and cause them to shrivel up. Any residual sprays left on buds at harvest will end up on the end product to be smoked. Smoking garden sprays is not desirable.

The flowering buds are sensitive to a pest that was previously not an issue. Caterpillars can begin populating your plant and eat your flowering buds from the inside out. Hence during the transition stage start spraying a preventative dose of Thuricide. Thuricide is a bacteria that starves out caterpillars when they consume it.

August 8<sup>th</sup> begin Thuricide 1 ounce/gallon mixed with either formula

August 8<sup>th</sup> Discontinue Companion and Plant Doctor

September 15<sup>th</sup> Discontinue Organicide, Dr. Bronner's, and CalCarb

September 22<sup>nd</sup> Discontinue all spray except Actinovate and compost tea sprayed only on the soil.

Oct 1<sup>st</sup> Discontinue all sprays

## Flowering Pruning

Pruning changes slightly as the plants transition from vegetative growth to flowering growth. Most if not all of your redundant stems and branches will be pruned at this point. As flowers begin to bloom on your plants you will start pruning the ones that will never accrue any density.

You may have branches and stems on the inside of your plant that have good growth on the outside of the plant that don't need vegetative pruning. However they will grow some flowers inside of the plant's border. Prune those flowers.

Some flowers may grow in the crotches of nodes. They have no room to expand to large buds. Prune those flowers.

Do all of your flower pruning early in the flowering season. End your final pruning session by the first week in September. Once you are that far in the blooming process any pruning you do will be detrimental to your final yield.

### Support System

Watch your plants' support needs as their flowers grow. Morning dew on heavy flowers can place a huge strain on your baling twine and trellising. Make a daily sweep in the morning or after a rainstorm when the plants are the heaviest. Search for hanging branches or broken trellising and make repairs where needed.

### Irrigation

Keep track of your TDS and follow the TDS schedule to pump up your plants with as many nutrients as they can handle. The more liquid bloom formula you progressively load into your irrigation the larger and heavier your buds will be. Schedule a salt flush with Botanicare Clearex in the 3<sup>rd</sup> week of August.

Adjust your watering frequency and volume when the plants are progressing into the bloom stage. The plants will require less water as the daily high and low temperatures drop and rain storms increase.

Make your first adjustments in accordance with the seasonal weather changes and when you first observe your plants' soil is still wet from a previous days' watering. If the pot is soaked take a day off from watering. If the pot seems as though it would completely dry out in the afternoon without any extra water adjust your watering times to from 15 minutes to 10.

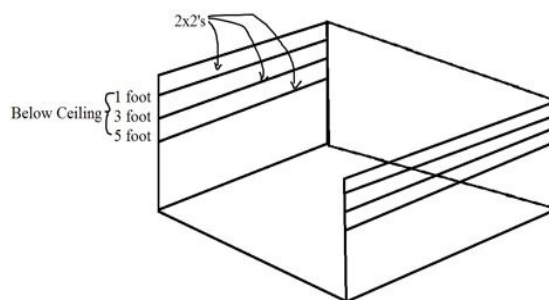
Continue to take days off when the pots are soaked and diminish your watering times by 10% intervals each time you observe your plants are not drying out. By October you may be watering only weekly for 8 minutes or not at all.

# Chapter Twenty-two: Dry Room Prep

For every harvested plant hanging in the dry room you will need 100 square feet of drying space. Plan to have a drying space large enough to house 1/4 of all of your plants. If you are growing 24 plants have at least 600 square feet ready.

Use 2x2's, drywall screws, 3 inch screws, and baling twine to create a multi layered system of drying lines. The 2x2's are screwed to the wall horizontally on two opposing walls. Drywall screws are screwed halfway in to the top horizontal face of the 2x2's. Baling twine is tied to the drywall screws and is strung back and forth across the room in 3 layers.

Screw 3 layers of 2x2's into the wall studs of the shorter in length wall (if there is a shorter wall, you want your strings to run the longest span of your room) with your 3 inch screws. If the door is on the adjacent wall, screw a set of 2x2's from one corner to 3 feet from the wall with the door. If the door is on the same wall as the 2x2's, screw from the opposite corner right up to the door frame. It's important to leave this empty space around the door to allow for the door to open and/or provide a pathway to enter the room.



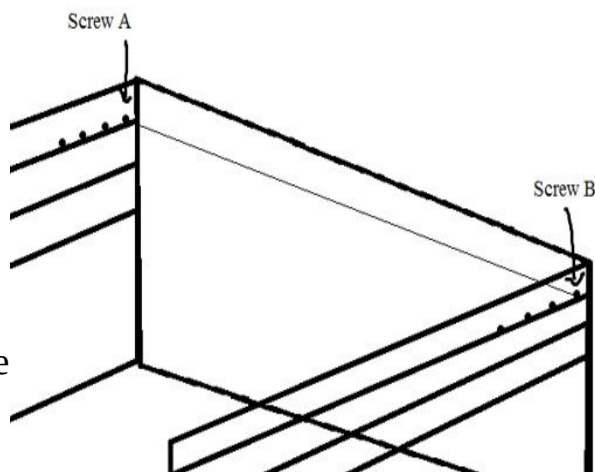
Orient the height of the 3 layers of 2x2's via the first layer at 5 feet below the ceiling, the second at 3 feet below the ceiling, and the third at 1 foot below the ceiling. We tie the first layer of hanging line 5 feet below the ceiling because it facilitates easy movement under the lines to hang and take down marijuana. However if you are limited in space you can hang lines as close to the floor that allows you to crawl.

Half screw all drywall screws. Screw drywall screws every 6 inches to the top horizontal face of the 2x2's. Screw the dry wall screws at the same distances on the first 2 layers of 2x2's. On the 3<sup>rd</sup> and highest layer screw the drywall screws at 6 inches apart, but place your first screw 3 inches from the wall instead of 6. That way they're staggered in between the first two layers' drywall screws. Do the same drywall screw scheme on the opposing wall's 2x2 layer. Screw each of your drywall screws with the intention of having another straight across the room form it.

Tie the loose end of your baling twine to the first screw (Screw A) on the top layer of 2x2's in the corner with an overhand knot followed by a slipknot. Run the baling twine across the room and tie (in the same overhand then slipknot fashion) to the drywall screw, Screw B, which mirrors Screw A. Make sure your line is taught and cut the excess baling

twine.

Run baling twine between all of the screws in the same way Screw A and Screw B were connected. Start with the top layer and move down after the completion of each layer. Tie each screw to one another with a separate length of twine. If you have a continuous line tying the screws to one another one break in the line could compromise the entire layer of baling twine.



Use the same intake/exhaust fan setup, oscillating fan, and dehumidifier from your grow room setup. The slight changes are to use two dehumidifiers per 600 square feet and set them to high. Keep your in the wall fans running no matter what temperature and use about 2 space heaters per 600 square feet.

The ideal temperature for the drying room is 70-78 degrees and the lowest humidity allowable is 40%. Add more heaters if your room is cooler and shut off heaters if it's hotter. As you add new marijuana to the room the humidity will go up. Generally the room's humidity will remain above 40% as you continuously add new plant material. If the humidity drops below 40% turn the dehumidifiers off until you add more new plant material.

# Chapter Twenty-three: Beginning Harvest

The big question of October is ‘when do I start to harvest?’ There are three different motives to begin harvesting. All of which require close inspection of your flowering buds. Harvest too early and you waste the potential of your crop. Harvest too late and risk having a useless product.

One reason to begin harvest is mold and mildew. If your plants begin to mold and/or mildew you must harvest them at the first sign. In the last week of September begin checking your plants daily for visible signs of mold and powdery mildew. And continue to inspect your plants for mold throughout your harvest. Mold is obvious to spot if you look for it. Any type of wet looking growth that’s not part of your bud is most likely mold. Mold tends to be grey or copper like in color. Powdery mildew looks like small amounts of white powder was dropped on the leaves.

If you see any mold or mildew record which plant is infected. Then check the rest of the garden for mold and mildew. Check all the plants of the same variety with extra scrutiny. Once a plant of a variety falls to mold it is likely the rest of the plants of that variety have or will mold soon. Record any additional mold findings and triage the infected plants. Decide which plant is molding the worst and harvest that one. Once your plant is harvested and drying the mold growth can be halted by the dry heat.

The second motive to harvest is pests. Consider your plants’ harvesting options if you discover insect pests such as spider mites, caterpillars, or hemp russet mites. When pest populations boom and there are no flowers or no heavy flowers treat the pests with the correct spray. You will have to decide if it’s time to harvest if you have an observable pest population with heavy flowers within 2 weeks of harvest.

If the pests are making noticeable damage to the flowers you must harvest as soon as possible. However if there are only signs of pests and damage is only on the vegetative parts of the plant you may be able to wait to harvest. If signs of mites are sighted and the plant doesn’t look sick you should wait to harvest as long as the plant looks healthy. Caterpillars can be treated with Thuricide up to 2 weeks before harvest. Do not spray Azamax or any other pesticide within 4 weeks of Harvest.

The last motive for harvesting is the best case scenario. Best case scenario harvest is when your flowering buds are ripe. The process for recognizing ripe buds requires the use of a 30x or higher eye loupe. Use the eye loupe to inspect the white hairs (trichomes) of the plants. When the plant is beginning to ripen all of the hairs will be white. As the buds mature the hairs begin to curl up and turn red. Harvest your plants when 40% of the hairs have turned red.

## Harvest Summary

First I'll present the harvest process in broad strokes. Harvesting starts with cutting down trellising and then cutting out branches. The branches are segmented down and placed in 30 gallon totes. Full totes are brought to the drying room where the branch segments are hung up on strings.

The ideal amount of time to dry your buds is in 3 days. You can dry your harvest in 1 day but this will result in a flavorless smoke. If you take longer than 3 days to dry you risk mold growth in your drying room.

When the branches are dried they are taken down off the strings they are placed in the 30 gallon totes again. The drying process requires at least two 30 gallon totes for each plant. The totes have an air tight snap lid and they are shaped in a 2:1:1 length, width, and height ratio.

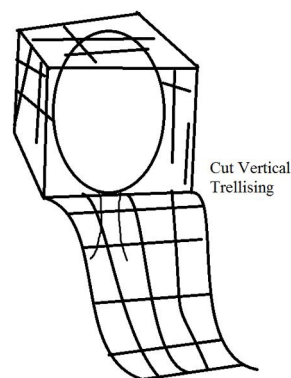
Once the totes are filled with dried harvest material they are placed in a hot room to sweat for 24 hours. After the buds have sweat they are bucked down (cut to smaller pieces) off the stem to buds no larger than 1.5 inches. The bucked down buds are stored in an oven turkey bag. They can be retrieved to be trimmed at your leisure.

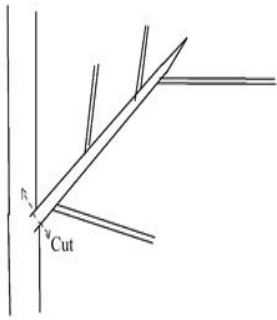
### Harvest Step by Step

To begin you must make the decision when to start harvesting and which plants to harvest first. In an ideal harvest you will start harvesting your earliest variety on the first few days in October. Have the following tools on hand for your harvest: ARS scissors, hand pruners, wide mouthed 16 ounce jar filled with rubbing alcohol, latex gloves, and multiple 30 gallon totes. Wear the latex gloves whenever handling buds to avoid resin covered hands and place your not-in-use scissors and pruners in rubbing alcohol to keep them from gumming up as well.

Use ARS scissors to cut out your vertical trellising on one face of the plant. Start from the bottom and cut up the sides. Use your orchard ladder to reach the top of the vertical face. Cut horizontally across your vertical trellising. Pull the trellising down and off the branches. Cut the bottom of the trellising and remove it.

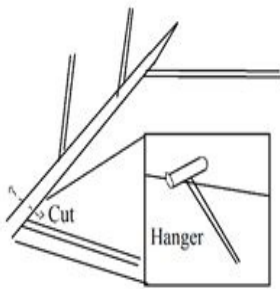
Expose one face of the plant without cutting any of the support tension. Leave your tensions support system in place throughout the harvest so your plants won't fall over or break before they are harvested.



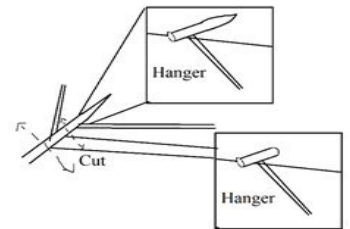
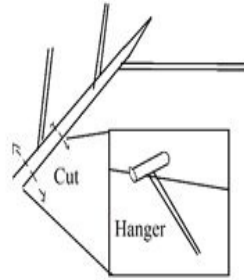


After the vertical face of trellising is cut away start at the bottom of the plant and use hand pruners to cut a branch at about 2-3 foot in length right behind a branch or node. Then break the branch down to 6-18 inch segments. To break down the branches cut an inch in front branch nodes for each broken down segment. The Y shape of the branch acts as the hanger for the segment.

Place your harvested branches in 30 gallon totes. Continue to cut all of the branches off the exposed face of the plant. Move on to the next face of the plant after you complete one and repeat until the plant devoid of buds.

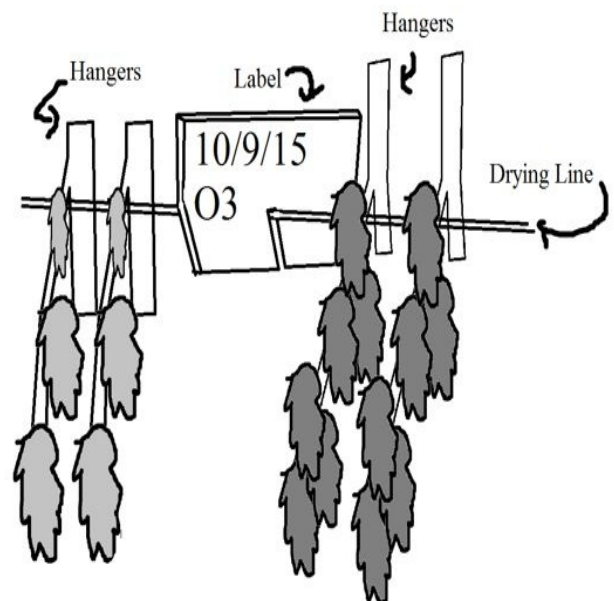


Bring your full totes to the drying room. Place the hangers on the string right beside one another. The buds will dry more



evenly the closer they are together. Start hanging from the back of the room opposite of the door on the highest string. Fill up the entire length of string then move to the next lowest. Complete an entire row of strings before you move to the next.

When you start hanging a new variety or start hanging on a new day place a label on the drying line where you start hanging. Write on the label the date and variety on each corresponding side. Make labels with a 2-3 inch square of cardboard. Make a cut at halfway through the square. Straddle the square's cut on the drying line.



After 3 days of drying your first day's harvest should be dry enough to take down off the line. If it is not dry enough or it is too dry adjust your room's equipment accordingly. You can tell when your buds are dried and ready to be taken down by touch. You should

only be able to feel slight moisture if you squeeze the bud. One test to be sure your buds are ready to be taken off the line is to snap the stem or branch. The bud is ready to come down off the line if you can snap the stem and it breaks all the way through without bending. The bud is not dry enough if the stem only bends or breaks in fibrous fragments.

Test your buds dryness every day to make sure they are drying at the correct rate. The stems will snap more cleanly as they become dryer. Test more frequently as the 3 day

mark approaches.

Next it's time to sweat your dried buds. The process of sweating moves moisture trapped inside the bud and the stick out into the air. As moisture in the stick moves to the bud and out into the air it carries more terpenes (compound responsible for marijuana's taste and smell) to the bud.

Place your dried material in 30 gallon totes. Leave a 2 inch air gap between the lip and the material. Snap the lid on the totes and stack them in your hot room to sweat. Keep your hot room at 85-90°F. Every 2 hours open your bins and flip the stack of branches 90°. When you open a bin of sweating material it should be noticeably wetter than it was when first placed in the bin. Leave the bins open for an hour (this step is known as burping) to allow the moisture to leave the bins. Rotate the branches 90° again and close the lid. 2 hours later repeat the process. Keep a humidity gauge in the room and for an hour at a time leave the door open to dryer air whenever the humidity is over 70%. Leave the dehumidifier out of the hot (sweat) room, they work too fast for sweating to occur properly.

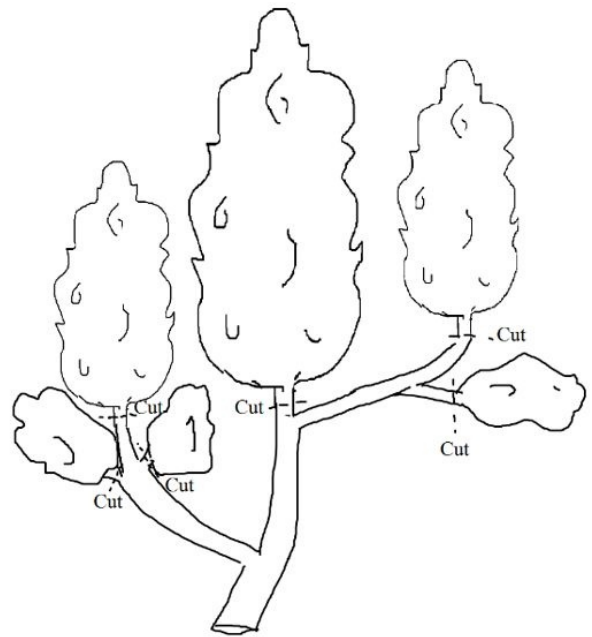
Continue to flip, burp, and sweat until you open a container that was sweating and the material still feels dry. Ensure the bud is totally dry with the same stem snapping test as before. Take this bin out of the hot room and into a room designated for processing. Whenever there is time free from harvesting and drying begin bucking dried and sweat material for storage. The branches can be left in the bin for a few days but the sooner they are in proper storage the better.



# Chapter Twenty-four: Processing Dried Bud

## Bucking

Stand with an empty open tote stacked on a closed tote in front of you and another stack with an empty to the right. Stack a full open tote on top of a closed tote to your left. Draw branches from left and use ARS scissors to cut buds from the branches. Keep a spare pair of ARS in a jar of rubbing alcohol and switch them out when your scissors get too gummed up with resin. Allow the cut buds to fall down into the tote in front of you. Dispose of the budless sticks in the bin to the right of you. At this point you can burn or compost these sticks.



Bucking Down Buds Off the Stem

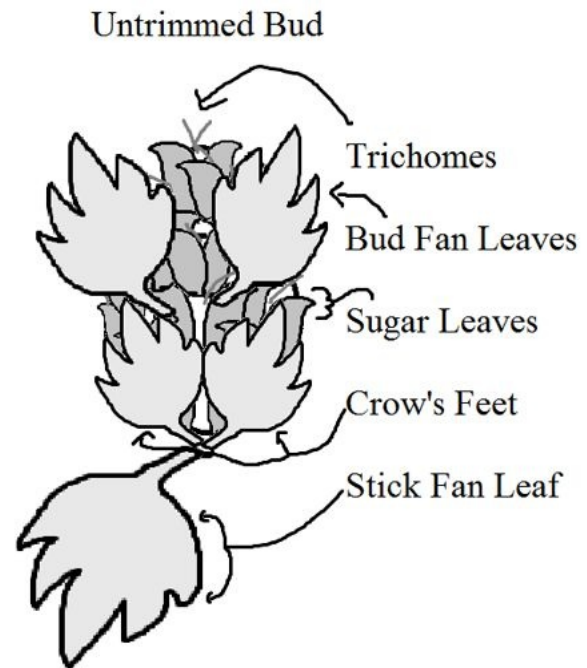
The buds are cut from the stick with certain guidelines. Cut the buds at their stem so that there are no exposed stems in the bud. The stems are cut flat across to prevent the pointed stems that poke holes in storage bags. The buds should be broken down so there is no visible stem in the bud structure. Buds are not broken down more than they need to be.

Load your tote of bucked down buds into turkey bags and tie off the top in a single over hand knot. Store your turkey bags in a cool, dark, and dry place. Return to these turkey bags to trim your pot when you have the time.

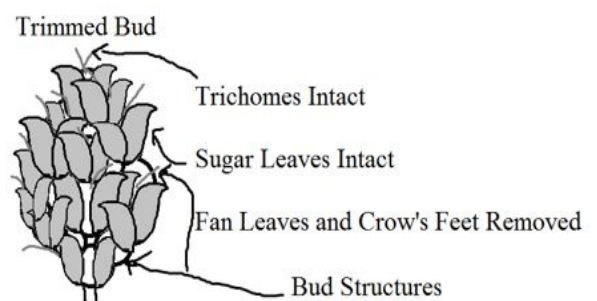
## Trimming Buds

The bucked down marijuana buds have extra material that has very little to no THC on them. The bud is more aesthetically pleasing and a more pleasant smoke with the excess material removed. The excess material is made up of fan leaves both on the stick and on the bud.

There are 4 types of leaves on an untrimmed bud: stick fan leaves, bud fan leaves, crow's feet (a type of exposed bud fan leaf), and sugar leaves. Stick Fan leaves are the fan leaves the stick (most stick fan leaves are left on the stick during the bucking process). Bud fan leaves are the fan leaves with stems growing from inside the bud. Crow's feet are the 2 bud fan leaves at the base of a bud right at the cut stem. Sugar leaves are the leaflets that are the petals of the marijuana flower. They're called sugar leaves because they are covered in sugar like THC crystals.



A properly trimmed bud has all of the different types of fan leaves removed and the sugar leaves, bud structure, and trichomes remain intact.



## Trimming Process

Start with good lighting, an ergonomic chair, a table, a jar of rubbing alcohol, latex gloves, a large sized bowl, turkey bags, and 2 pairs of ARS scissors. Place a few handfuls of buds on the table at arm's length. Place the bowl to your left and place your jar of scissors at arm's length to the right.

Retrieve one bud at a time and trim excess material off. Cut the as close as you can without cutting into the bud or flower structure. Adjust the stem for flatness and break down the bud further if need be. Once the bud is finished place it in the bowl.

Over time the excess material will collect on the table under your scissors. The excess material is called trim and is still valuable and psychoactive. You can collect the trim to make hash or compost it. Keep the trim separate from your pile of buds on the table or you are liable to lose buds in your trim.

Some buds are very small and difficult to trim these are called littles. Some buds are so airy and wispy they can't be trimmed and are not desirable buds. These buds are called larf and most people keep them with the trim.



# Conclusion

Enjoy your herb. If you follow this plan exactly under the correct circumstances you can expect huge yields. You will have 10 pound plants.